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Semiconductor/SPE sector

Raising WFE market forecasts to a 28% CAGR in 2025–28

We raise our wafer fab equipment (WFE) market growth forecasts for CY2026 from 28% to 31% YoY, for CY2027 from 29% to 38%, and for CY2028 from 16% to 17%. Cloud service providers (CSPs) are accelerating their investments in response to further growth in AI-related demand, and we expect total investment by the top four US CSPs in 2025–28 to increase by a 58% CAGR (the sum of estimates by JPManalysts covering the stocks; see Figures 42–45 for details). In response, chipmakers are increasingly keen to invest in leading-edge technologies, a factor driving growth in demand for technically complex equipment. From 2027 onward, we think a key factor will be the impact of price revisions, in addition to increased equipment demand as cleanroom start-ups/ramp-ups get underway in earnest.

- **Raising our 2026–28 WFE market forecasts:** Our bottom-up forecasts for WFE market growth are now 31% YoY (to $163 billion; previously 28%) for CY2026, 38% (to $225 billion; previously 29%) for CY2027, and 17% (to $263 billion; previously 16%) for CY2028 (a 28% CAGR for 2025–28; see Figure 21for details). DRAM and TSMC are the main reasons for the upward revisions, but we also raise our assumptions for all applications, including NAND flash memory and logic chips. Heavy investment in DRAM will probably continue, but given DRAM's growing importance in AI computing, we expect supply to fail to keep up with demand even in CY2028 (see our global memory report by Jay Kwon et al.). Similarly for TSMC, we expect N2/N3/N5 utilization to remain above 100%, until at least 2028, driven by increased demand for AI accelerators and agentic AI CPUs (see our foundry report by Gokul Hariharan et al.). Equipment makers' pricing strategies are also entering a new phase. While the industry structure of value-based pricing remains unchanged, some companies (e.g., Tokyo Electron) are beginning to reflect cost increases in prices. Going forward, (1) equipment makers with a high weighting of sales to DRAM/TSMC will likely continue to be favored, but we think other factors that are also likely to be important are (2) supply capacity, including component procurement, to meet strong demand, and (3) the extent of margin improvement through price revisions and other measures.
- **Semiconductor shipments:** The global figure (by value) increased 131% YoY in July 2026, marking the 35th consecutive month of growth since September 2023 and the strongest increase since at least 1994. While volume also grew by a double-digit percentage, the increase continued to be driven largely by memory chip prices (both NAND flash memory and DRAM prices rose YoY by triple-digit percentages). MoM growth in memory chip prices has settled down to a single-digit percentage but remains high (see our WSTS report by Harlan Sur et al.).

Japan Equity Research

Technology - Semiconductor/ Technical Materials

Mio Shikanai AC
(81-3) 6736 1313
mio.shikanai@jpmorgan.com
JPMorgan Securities Japan Co., Ltd.

Harlan Sur AC
(1-415) 315-6700
harlan.sur@jpmorgan.com
J.P. Morgan Securities LLC

Sandeep Deshpande AC
(44-20) 7134-5276
sandeep.s.deshpande@jpmorgan.com
J.P. Morgan Securities plc

Junya Ayada
(81-3) 6736 8631
junya.ayada@jpmorgan.com
JPMorgan Securities Japan Co., Ltd.

Gokul Hariharan
(852) 2800-8564
gokul.hariharan@jpmorgan.com
J.P. Morgan Securities (Asia Pacific) Limited/ J.P. Morgan Broking (Hong Kong) Limited

Jay Kwon
(82-2) 758-5725
jay.h.kwon@jpmorgan.com
J.P. Morgan Securities (Far East) Limited, Seoul Branch

Billy Feng
(86-21) 6106 6359
billy.feng@jpmorgan.com
SAC Registration Number: S1730520030005
J.P. Morgan Securities (China) Company Limited

Apoorva Kumar
(1-212) 270-0668
apoorva.kumar@jpmorgan.com
J.P. Morgan Securities LLC

Mayur Ramdhani
(1-212) 622-1664
mayur.ramdhani@jpmorgan.com
J.P. Morgan Securities LLC

Jimmy Huang
(886-2) 2725-9865
jimmy.huang@jpmorgan.com
J.P. Morgan Securities (Taiwan) Limited

See page 32 for analyst certification and important disclosures, including non-US analyst disclosures.

JPMorgan Securities Japan Co., Ltd.
Mio Shikanai AC
(81-3) 6736 1313
mio.shikanai@jpmorgan.com

- **(US SPE) Highlighting KLAC as our top pick among US semicaps given attractive risk/reward:** Although we are positive on the entire semiconductor capital equipment complex, we see the most attractive risk/reward in KLAC given its relative underperformance YTD, underappreciated exposure to foundry/logic-led WFE spending in 2027, and potential for upward revisions to consensus revenue estimates. Despite being up ~50% YTD, KLAC shares have meaningfully lagged large-cap peers such as LRCX and AMAT, which are up ~85% and ~82%, respectively (while SOX is up ~68%). However, this underperformance can largely be explained by the fact that LRCX and AMAT have more directly benefited from the pickup in memory-related WFE spending over the LTM, whereas KLAC's process control tools tend to see stronger demand when customers are taping out new nodes rather than simply adding incremental capacity. As we look into 2027, we believe that the spending mix should increasingly rotate in KLAC's favor. We expect foundry/logic to represent a larger share of WFE growth, and we expect that mix shift to disproportionately benefit KLAC as F/L customers constitute a significant portion of its total orders. We would also highlight that customers such as INTC (historically not a big KLAC customer but now engaging more heavily as INTC management focuses more on yield/cost) appear to be ratcheting up capex budgets for 2027, which should create potential upside to current consensus estimates for KLAC's CY2027 revenues.
- **(European SPE) ASML our top pick:** Despite being up 62.5% in FY2026 (vs the AEX +16%), ASML is underperforming US peers, possibly as the timing of its shipments are more FY2027 and FY2028 loaded due to ASML lead times being the longest among SPE suppliers. With recent indication of Samsung adoption of High NA EUV in production in '28, ASML has another growth driver that is beyond the cycle in the DRAM market. With ASML having 100% share in EUV, it should be a key beneficiary of SPE growth in FY2027 and FY2028 that we are forecasting.
- **(Japanese SPE) Still favor Tokyo Electron in the front-end area and Advantest in the back-end:** We forecast the WFE market will grow at a 28% CAGR in 2025–28 and remain bullish on SPE stocks. Our top picks for the longer term are Tokyo Electron (8035, Overweight) in the front-end area and Advantest (6857, Overweight) in the back-end. We like Tokyo Electron for (1) its high exposure to TSMC/DRAM, (2) its strong supply capacity (capacity expansions, including at the Miyagi Production Innovation Center, are slated for completion in summer 2027), and (3) our expectation that the benefits of price revisions, including like-for-like, will emerge from 2H (mainly 4Q) FY2026. For Advantest, we expect a strong operating profit CAGR of 47% in FY2025–28, backed by the company's strong presence in GPUs/ASICs/CPUs and as testers become increasingly important owing to the growing complexity and added value of semiconductor chips.

JPMorgan Securities Japan Co., Ltd.
Mio Shikanai [AC]
(81-3) 6736 1313
mio.shikanai@jpmorgan.com

J.P.Morgan

Contributing Authors

Technology - Semiconductor / Technical Materials
Mio Shikanai [AC]
mio.shikanai@jpmorgan.com
(81-3) 6736-1313

Semiconductors & Semiconductor Capital Equipment / IT Hardware
Harlan Sur [AC]
harlan.sur@jpmorgan.com
(1-415) 315-6700

Technology - Consumer Electronics / Industrial Electronics / Precision
Junya Ayada
junya.ayada@jpmorgan.com
(81-3) 6736-8631

Technology and Telecoms
Gokul Hariharan
gokul.hariharan@jpmorgan.com
(852) 2800 -8564

Technology - Semiconductors
Jay Kwon
jay.h.kwon@jpmorgan.com
(82-2) 758-5725

European Tech Hardware & Payments
Sandeep Deshpande [AC]
sandeep.s.deshpande@jpmorgan.com
(44-20) 7134-5276

Technology
Billy Feng
billy.feng@jpmorgan.com
(86-21) 6106-6359

Semiconductors & Semiconductor Capital Equipment / IT Hardware
Mayur Ramdhani
mayur.ramdhani@jpmorgan.com
(1-212) 622-1664

Technology
Jimmy Huang
jimmy.huang@jpmorgan.com
(886-2) 2725-9865

Semiconductors & Semiconductor Capital Equipment / IT Hardware
Apoorva Kumar
apoorva.kumar@jpmorgan.com
(1-212) 270-0668

Technology - Hardware
Albert Hung
albert.hung@jpmchase.com
(886-2) 2725-9875

Technology - Semiconductors
Sangsik Lee
sangsik.lee@jpmorgan.com
(82-2) 758 5146

Technology and Telecoms
Subham Singhania
subham.singhania@jpmorgan.com
(91-22) 6157-3801

Technology
Ri Xu
ri.xu@jpmchase.com
(86-21) 6106 6318

Technology - Semiconductors
Neelay Y Kamath
neelay.kamath@jpmchase.com
(91-22) 6157-3764

Top picks of JPM tech team analysts within SPE

Billy Feng	AMEC-A (688012 CH), NAURA-A (002371 CH)
Gokul Hariharan	ASMPT Ltd (522 HK)
Harlan Sur	KLA Corporation (KLAC US)
Jimmy Huang	Hon. Precision (7769 TT), Grand Process Tech (3131 TT)
Mio Shikanai	Tokyo Electron (8035 JT), Advantest (6857 JT)
Sandeep Deshpande	ASML (ASML NA)

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JPMorgan Securities Japan Co., Ltd.
Mio Shikanai AC
(81-3) 6736 1313
mio.shikanai@jpmorgan.com

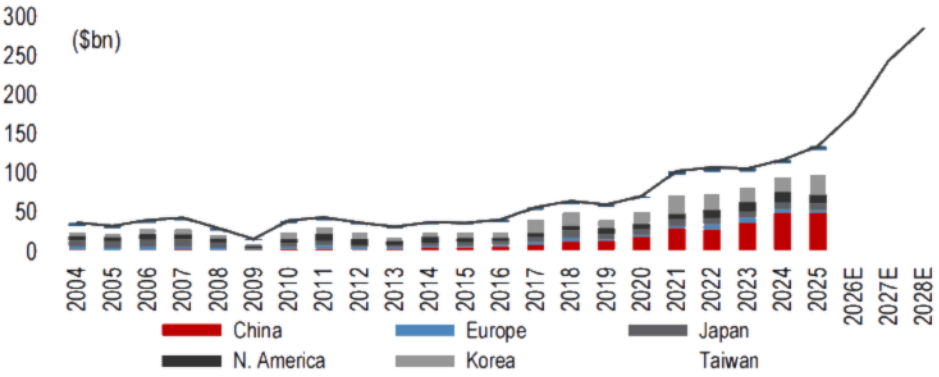
Our global tech team's main assumptions for end demand are for (1) iPhone sales volume to increase 1.3% YoY in CY2026 and decrease 1.5% in CY2027, (2) notebook PC shipment volume to decrease 6.9% YoY in CY2026 and increase 1.9% in CY2027, (3) server shipments to increase 22.2% YoY in CY2026 and rise 25.0% in CY2027, and (4) smartphone shipment volume to decline 11.3% YoY in CY2026 and decrease 2.6% in CY2027 (see Figure 35for details). Based on aggregate capex by major semiconductor makers, we forecast the WFE market will grow 31% YoY in CY2026, 38% YoY in CY2027 and 17% YoY in CY2028 (see Figure 21for details).

Figure 1: Shipment value of semiconductors and SPE (YoY)



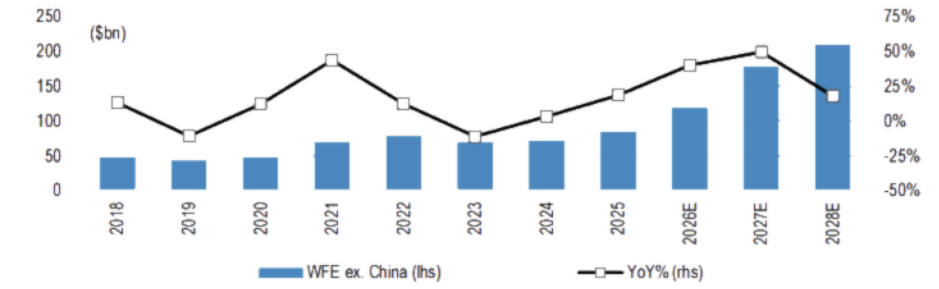
Source: WSTS, SEMI, SEAJ, J.P. Morgan.

Figure 2: SPE shipment trend by region



Source: SEMI, J.P. Morgan estimates.

Figure 3: Global SPE shipment trend excluding China



Source: Gartner®, J.P. Morgan estimates.

- **Asia tech strategy:** The recent pullback of more than 20% in Asia tech stocks and the SOX is the third of the AI upcycle since end-2022. However, we see no sign that fundamentals will deteriorate materially over the next 6–12 months. AI scaling laws still hold. Model competition between the frontier AI labs continues, token demand keeps growing, and agentic AI is improving profitability across the AI ecosystem. The market is concerned about the sustainability and funding of hyperscaler AI investment, but we expect the major CSPs to keep investing through 2027 and to tap the bond and equity markets as needed. We think stocks have begun to price in near-term EPS downgrades and capex cuts. If anything, we see upward EPS revisions and higher capex as the more likely outcome. SPE is the best-placed subsector, with tailwinds from higher capex at TSMC and the memory makers, and from investment in advanced packaging, CPO/NPO, and 3D packaging. IC substrates also look promising, driven by larger AI accelerators, rising server CPU demand, EMIB-T from 2H 2027, and CPO. However, while supply-demand fundamentals in memory are strong, concerns about demand destruction from lower HBM/SOCAMM specifications could cap further valuation gains. (Reference: August 5 report by Gokul Hariharan et al.)
- **SPE:** We raise our WFE market growth forecasts from 28% to 31% YoY for CY2026, from 29% to 38% for CY2027, and16% to 17% for CY2028. Our forecast is based on each device maker's capex, and is calculated by estimating the equipment ratio within that investment amount. Accelerating CSP investment is further strengthening chip demand. We have again raised our estimates mainly for DRAM and TSMC, as in our previous update (June 2026). We have also raised them for every other application, including NAND and logic (see Figure 21). We expect supply to continue lagging demand at both the DRAM makers and TSMC through at least CY2028. NAND investment also remains disciplined, but inference AI is driving eSSD demand sharply higher. Kioxia/SanDisk announced in August greenfield investment in Japan to meet that strong demand, with operations scheduled to start in FY2029. Expectations for equipment demand from CY2029 are also gradually building. That said, three factors will be important for stock selection in the near term: (1) the share of revenue from DRAM and TSMC, (2) the ability of supply to meet strong demand, including the ability to procure materials, and (3) the degree of margin improvement from measures such as price revisions.
- **China WFE:** Our main takeaways from CSEAC 2026 are that (1) resilient capex and localization remain the foundation of growth for China's SPE industry, and (2) the major players are strengthening their defensive position by expanding aggressively into advanced technology and materials. We raise our capex forecasts for China fabs by 10% for 2026 and 9% for 2027, and newly estimate $54.7 billion for 2028 (a CAGR of 7% over 2025–28). This reflects the CXMT and YMTC listings, the AI-driven memory supercycle, and the strategic importance of building a domestic AI chip supply chain. We expect domestic Chinese investment in advanced logic and memory to grow at a CAGR of 12% through 2028, equipment localization to rise from around 25% in 2025 to 40%, and the TAM for domestic vendors to expand at a CAGR of 25%. AMEC has launched six new tools, including high-aspect-ratio etch and molybdenum ALD, and a shorter R&D cycle is accelerating its product expansion. Technology gaps remain wide in metrology/inspection and lithography, but we see these as a long-term opportunity rather than a near-term constraint. (Reference: September 3 report by Billy Feng et al.)
- **CoWoS/advanced packaging:** We again raise our forecast for TSMC's CoWoS capacity, from 115k/175k/220k wfpm to 115k/190k/225k wfpm at end-2026/2027/2028. TSMC is accelerating the build-out by allocating more of AP7

Phase 2 to CoWoS and outsourcing interposers to Vanguard. We estimate that OSAT CoWoS-like capacity will expand in parallel, to 15k/50k/85k wfpm. On the demand side, we expect NVIDIA to deliver Rubin/Feynman and the Vera/Rosa CPUs in 2027/2028, with LPUs and Spectrum X CPO over the 2027–28 timeframe. At AMD, the Venice CPU is the main driver of our upward revision, and we also expect MI450/MI500 in 2027/2028. We estimate that Google TPU volumes will keep rising with v8 and v9. Demand for AWS Trainium 3 also exceeds supply. We expect Trainium 4, which we see ramping in 2028, to be more complex to design as it adopts 3D SoIC and multiple interconnects. We estimate that 3D SoIC will scale up in earnest in 2028, with adoption widening beyond AMD (MI series) and Apple (M5 Max and Ultra CPUs) to some products at AWS, OpenAI, Nexus, Meta, and NVIDIA. (Reference: July 10 report by Gokul Hariharan et al.)

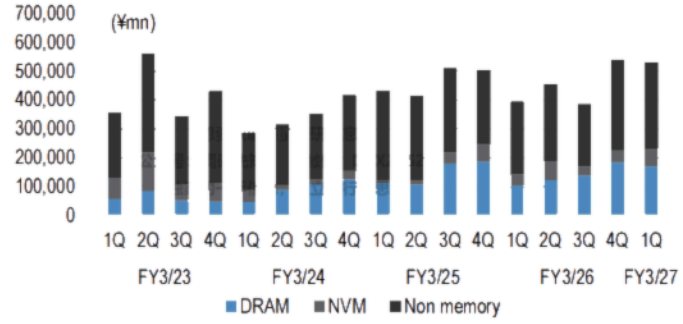
- **Foundry:** TSMC raised its FY2026 dollar revenue growth guidance to more than 40% and its capex to $60–64 billion at April–June (CY2Q26) results, confirming that visibility on AI demand now extends to 2029–30. We expect TSMC's N2/N3/N5 utilization to remain above 100% through 2028. Utilization is also rising at the mature foundries, driven by AI-adjacent demand. We expect UMC to move from 85% in 2Q to around 90% in 3Q, Vanguard to rise further in 3Q from around 90% in 2Q, and SMIC to hold at around 95% in 3Q, in line with 2Q. PSMC's utilization is also high for both memory and logic. On pricing, TSMC may raise N2/N3 prices by a further 10% or more in early 2027, and we expect prices at the mature foundries to rise as well, including on 8-inch (Reference: August 28 report by Gokul Hariharan et al.)
- **TSMC:** TSMC's April–June 2026 results left us more confident in the sustainability of data center AI demand, in its aggressive investment to resolve the shortage of leading-edge capacity, and in its ability to maintain its competitive advantage. Visibility on AI demand now extends to 2029–30, and we think TSMC is likely to raise its data center AI revenue CAGR guidance (we estimate a CAGR of 69% over 2024–29). We therefore raise our capex forecasts for 2026/2027/2028 from $56 billion/$65 billion/$72 billion to $62 billion/$81 billion/$90 billion. We estimate that leading-edge capacity at N5 and below will expand at a CAGR of 24% over 2026–28, led by N2, N3, and advanced packaging. We estimate N2 capacity at 60k/118k/177k wfpm and N3 capacity at 178k/223k/243k wfpm at end-2026/2027/2028. (Reference: July 17 report by Gokul Hariharan et al.).
- **OSAT:** The major non-China OSATs guided for mid-single-digit to low-double-digit QoQ revenue growth in 3Q26 at their CY2Q26 results. They said that advanced packaging and AI-adjacent mainstream demand (power and networking, for instance) would drive that growth. ASE guides for FY2026 revenue growth of more than 20% YoY in mainstream alone. Amkor is also seeing a similar pace, with growth of 21% in 1H26. In test, specialization continues, with ASE focused on chip probing (CP) and KYEC on final test (FT) for NVIDIA GPUs. We believe that Advantest's burn-in tester has passed qualification at ASE, which leaves scope for ASE to become a second source for AI GPU FT, probably from NVIDIA Rubin. That said, we expect ASE to prioritize higher-margin CP testers for now, partly because of cleanroom constraints. (Reference: September 2 report by Gokul Hariharan et al.)
- **Memory:** We raise our 2026–28 memory TAM by 4–8%, reflecting revisions to our CoWoS and PC/server assumptions. We expect the shortage to persist for the next two years, worsening in 2027 (we estimate supply at 70–80% of demand) before easing somewhat in 2028. In HBM we cut our bit demand estimates to reflect a

longer life for the 8-high product cycle, a delayed 12-high ramp, and later adoption of 16-high. However, we raise our 2027 HBM price estimate to +42% YoY, and our HBM market forecast with it. The lower SOCAMM capacity on NVIDIA's Vera CPU and the HBM spec reduction on Rubin Ultra (from 16-high HBM4E to 8/12-high HBM4E) are content efficiencies designed to cope with supply constraints. We do not see them as a signal of slowing demand, and think that higher GPU and AI CPU volumes can offset them. We estimate that DRAM capacity will expand from 1.9 million WSPM at end-2025 to 2.85 million WSPM at end-2028. Even so, we expect supply to continue lagging demand, given HBM's 3-4x die penalty and a rising HBM mix. We estimate that a further 300k WSPM would be needed to balance supply and demand in 2028, but we doubt that this is achievable. The memory makers have indicated prepayments of 20–25% and volume coverage of 50–70% on long-term agreements (LTAs), which indicates their strong bargaining power. We also estimate a price premium of around 30–40% for AI and server applications, which are the core of these LTAs, over other applications. (Reference: August 9 report by Jay Kwon et al.)

- **PC/server:** We revise our global PC/server shipment growth estimates to -8%/+22% for 2026, +2%/+25% for 2027, and +2%/+19% for 2028. PCs were more resilient than we had assumed in 1H26 and server demand was stronger, but we think that PC demand remains fragile because of rising component costs, memory above all. PC makers raised prices by 20–30% in 1H26 on higher memory prices, and further increases are likely in 2H26. We are wary of a pullback in demand as price elasticity bites. However, in servers we estimate that AI accelerator demand will grow at a CAGR of 50% over 2025–28, and we expect agentic AI server CPU demand to reach 53 million units over the same period. We therefore estimate strong growth in general server CPU shipments of +37%/+27% YoY in 2027/2028. ARM CPUs may achieve further penetration, but x86 should also maintain double-digit growth, helped by AMD Venice among others. In AI servers, we assume volume production of the VR200 rack in 4Q26. Our main focus points from 2027 will be the Kyber and Oberon rack configurations. (Reference: July 15 report by Albert Hung et al.)

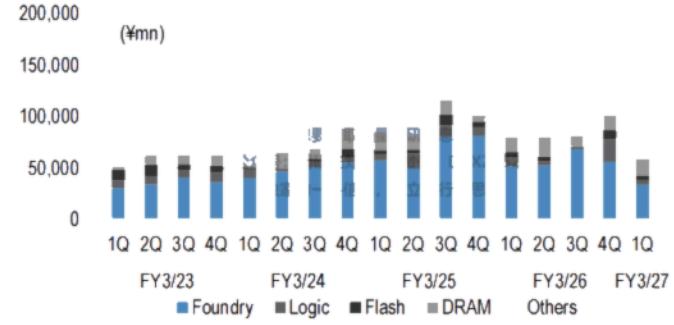
JPMorgan Securities Japan Co., Ltd.
Mio Shikanai AC
(81-3) 6736 1313
mio.shikanai@jpmorgan.com

Figure 4: Tokyo Electron SPE sales



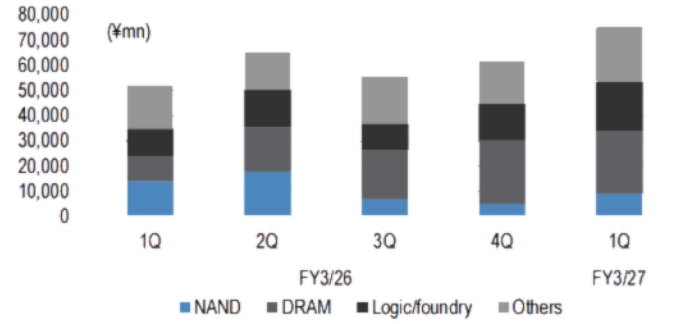
Source: Company reports, J.P. Morgan.

Figure 5: SCREEN HD SPE sales



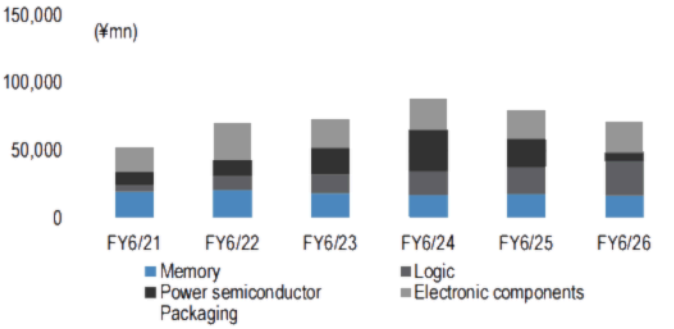
Source: Company reports, J.P. Morgan.

Figure 6: KOKUSAI Electric equipment sales



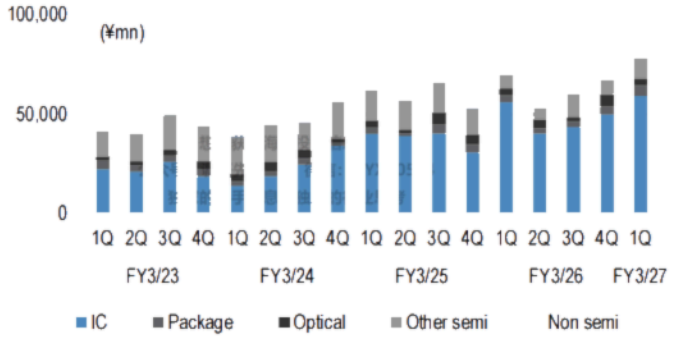
Source: Company reports, J.P. Morgan.

Figure 7: Ulvac semiconductor & electronic device production equipment sales



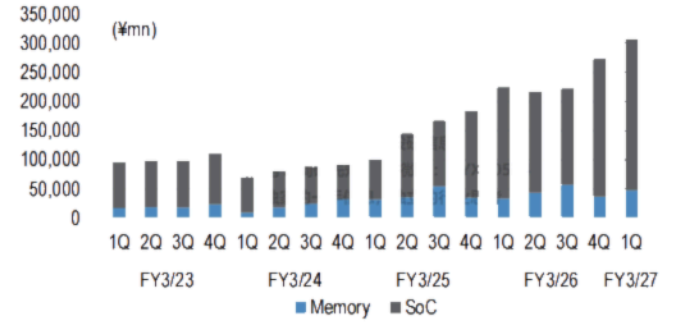
Source: Company reports, J.P. Morgan.

Figure 8: Disco precision processing equipment shipments



Source: Company reports, J.P. Morgan.

Figure 9: Advantest test system sales



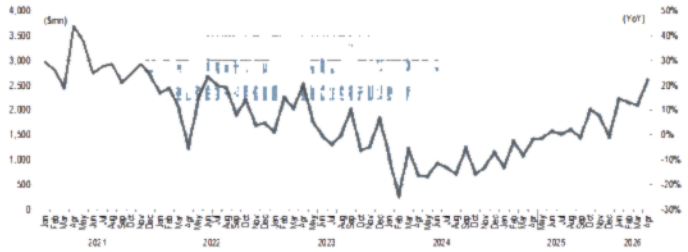
Source: Company reports, J.P. Morgan.

JPMorgan Securities Japan Co., Ltd.
Mio Shikanai AC
(81-3) 6736 1313
mio.shikanai@jpmorgan.com

J.P.Morgan

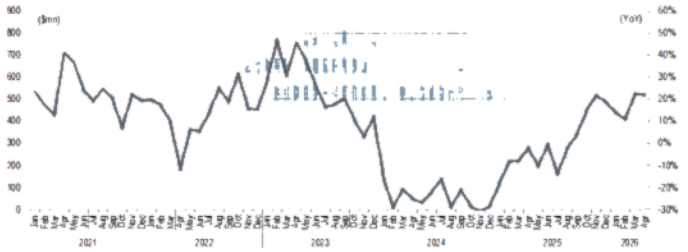
Sector data

Figure 10: Discretes global net billings



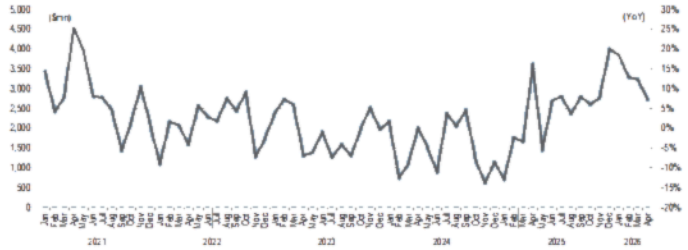
Source: Compiled by J.P. Morgan based on WSTS data.
Note: Line graph shows YoY.

Figure 11: IGBT (Insulated Gate Bipolar Trans) global net billings



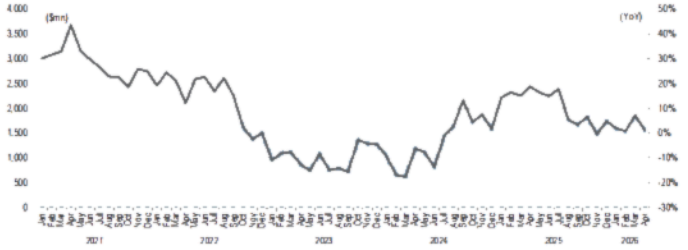
Source: Compiled by J.P. Morgan based on WSTS data.
Note: Line graph shows YoY.

Figure 12: Optoelectronics global net billings



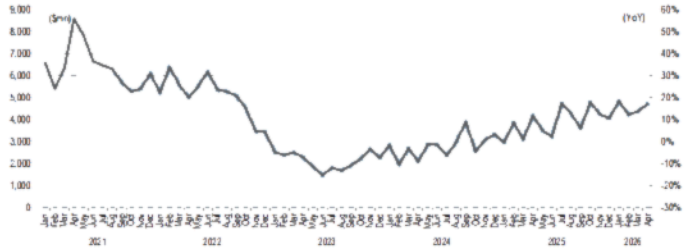
Source: Compiled by J.P. Morgan based on WSTS data.
Note: Line graph shows YoY.

Figure 13: Sensors & Actuators global net billings



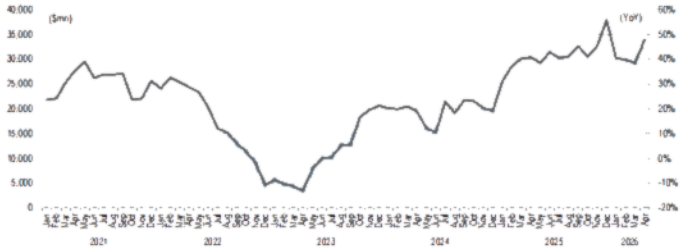
Source: Compiled by J.P. Morgan based on WSTS data.
Note: Line graph shows YoY.

Figure 14: Analog global net billings



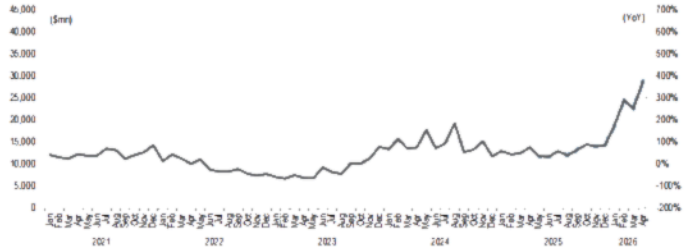
Source: Compiled by J.P. Morgan based on WSTS data.
Note: Line graph shows YoY.

Figure 15: Logic global net billings



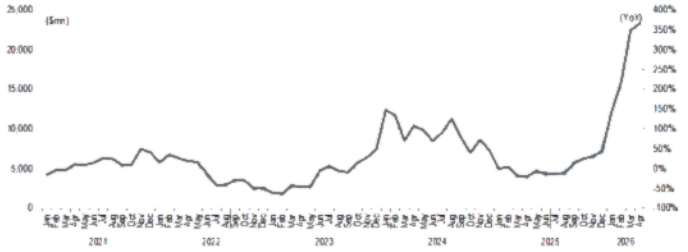
Source: Compiled by J.P. Morgan based on WSTS data.
Note: Line graph shows YoY.

Figure 16: MOS DRAM global net billings



Source: Compiled by J.P. Morgan based on WSTS data.
Note: Line graph shows YoY.

Figure 17: NAND Flash Memory global net billings



Source: Compiled by J.P. Morgan based on WSTS data.
Note: Line graph shows YoY.

JPMorgan Securities Japan Co., Ltd.
Mio Shikanai AC
(81-3) 6736 1313
mio.shikanai@jpmorgan.com

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Figure 18: Monthly semiconductor shipments

Unit:$bn		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	2026	**82.9**	**103.7**	**118.3**	**115.8**	**140.5**	**157.5**	**142.5**					
	(YoY)	63.2%	91.6%	91.5%	110.3%	132.9%	143.9%	131.4%					
	2025	**50.8**	**54.1**	**61.8**	**55.1**	**60.3**	**64.5**	**61.6**	**68.6**	**78.2**	**71.5**	**80.6**	**84.5**
	(YoY)	15.2%	20.9%	18.9%	23.4%	18.8%	18.4%	26.4%	22.2%	28.0%	34.5%	37.4%	43.0%
	2024	**44.1**	**44.7**	**52.0**	**44.6**	**50.8**	**54.5**	**48.7**	**56.2**	**61.1**	**53.2**	**58.7**	**59.1**
	(YoY)	17.8%	17.2%	18.4%	16.6%	22.6%	15.9%	18.1%	28.0%	23.3%	14.7%	22.6%	14.1%

Source: WSTS, J.P. Morgan.

Figure 19: Quarterly semiconductor shipments

Unit:$bn	1Q23	2Q23	3Q23	4Q23	1Q24	2Q24	3Q24	4Q24	1Q25	2Q25	3Q25	4Q25	1Q26	2Q26
	119.5	**126.7**	**134.7**	**146.0**	**140.8**	**149.9**	**166.0**	**170.9**	**166.7**	**179.9**	**208.4**	**236.6**	**304.9**	**413.7**
(YoY)	-21.3%	-15.8%	-4.5%	12.1%	17.8%	18.3%	23.2%	17.1%	18.4%	20.0%	25.6%	38.5%	82.9%	130.0%
(QoQ)	-8.2%	6.0%	6.3%	8.4%	-3.5%	6.5%	10.7%	3.0%	-2.5%	7.9%	15.8%	13.6%	28.9%	35.7%

Source: WSTS, J.P. Morgan.

Figure 20: TSMC sales trend

		FY24				FY25				FY26E				FY23	FY24	FY25	FY26E	FY27E	FY28E
		1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3QE	4QE						
NT$bn	**Sales**	**592.6**	**673.5**	**759.7**	**868.5**	**839.3**	**933.8**	**989.9**	**1,046.1**	**1,134.1**	**1,270.4**	**1,457.0**	**1,617.8**	**2,161.7**	**2,894.3**	**3,809.1**	**5,479.3**	**7,443.5**	**9,319.8**
	(YoY)	16.5%	40.1%	39.0%	38.8%	41.6%	38.6%	30.3%	20.5%	35.1%	36.0%	47.2%	54.7%	-4.5%	33.9%	31.6%	43.8%	35.8%	25.2%
	(QoQ)	-5.3%	13.6%	12.8%	14.3%	-3.4%	11.3%	6.0%	5.7%	8.4%	12.0%	14.7%	11.0%						
US$mn	**Sales**	**18,844.6**	**20,814.3**	**23,513.3**	**26,835.0**	**25,524.8**	**30,073.8**	**33,096.6**	**33,730.7**	**35,898.4**	**40,200.7**	**45,531.1**	**50,555.6**	**69,302.1**	**90,013.1**	**122,456.5**	**172,194.4**	**232,610.4**	**291,244.7**
	(YoY)	12.6%	33.0%	36.3%	36.6%	35.4%	44.5%	40.8%	25.7%	40.6%	33.7%	37.6%	49.9%	-8.6%	29.9%	36.0%	40.6%	35.1%	25.2%
	(QoQ)	-4.1%	10.5%	13.0%	14.1%	-4.9%	17.8%	10.1%	1.9%	6.4%	12.0%	13.3%	11.0%						

Source: Company data, J.P. Morgan estimates (covered by Gokul Hariharan, forecast as of July 16, 2026).

JPMorgan Securities Japan Co., Ltd.
Mio Shikanai AC
(81-3) 6736 1313
mio.shikanai@jpmorgan.com

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Figure 21: Capex estimates for semiconductor companies

CY (US$mn)	2018	2019	2020	2021	2022	2023	2024	2025	2026E	2027E	2028E	2026E (old)	2027E (old)	2028E (old)
Logic														
Intel	11,900	14,400	12,759	19,000	26,000	25,750	23,224	6,243	20,000	26,000	22,000	19,000	21,000	24,000
Texas Instruments	1,130	925	900	1,700	3,300	5,000	4,820	4,550	2,590	2,600	2,600	2,750	2,900	3,100
Others	4,850	4,825	4,930	6,300	8,800	8,000	8,980	8,000	8,750	9,250	9,500	8,500	9,000	9,500
Total	**17,880**	**20,150**	**18,589**	**27,000**	**38,100**	**38,750**	**37,024**	**18,793**	**31,340**	**37,850**	**34,100**	**30,250**	**32,900**	**36,600**
Y/Y % changes	*20%*	*13%*	*-8%*	*45%*	*41%*	*2%*	*-4%*	*-49%*	*67%*	*21%*	*-10%*	*1%*	*9%*	*11%*
Foundry														
TSMC	10,460	15,000	17,500	30,040	36,000	30,450	29,800	40,900	62,000	81,000	90,000	56,000	65,000	72,000
Samsung Logic	2,500	4,500	7,500	10,100	9,300	11,300	5,900	3,416	10,200	9,800	11,400	10,400	8,600	8,600
Globalfoundries	1,150	588	449	1,698	3,059	1,804	625	722	1,386	1,401	1,541	1,310	1,387	1,456
UMC	651	574	1,000	1,713	2,690	2,935	2,756	1,542	2,100	2,700	2,000	1,520	1,620	1,630
SMIC	1,800	1,870	5,251	4,500	6,172	7,630	7,670	8,403	9,005	7,000	7,000	8,200	7,000	7,000
Hua Hong	239	922	1,087	939	996	907	2,780	1,814	2,070	2,350	2,186	1,741	2,506	2,123
Others	410	661	240	831	1,285	1,761	1,227	2,315	2,500	1,800	1,200	2,600	1,900	1,200
Total	**17,211**	**24,114**	**33,027**	**49,820**	**59,502**	**56,786**	**50,757**	**59,112**	**89,261**	**106,051**	**115,327**	**81,771**	**88,013**	**94,009**
Y/Y % changes	*-21%*	*40%*	*37%*	*51%*	*19%*	*-5%*	*-11%*	*16%*	*51%*	*19%*	*9%*	*38%*	*8%*	*7%*
DRAM														
Samsung	11,819	7,291	9,204	14,008	13,652	16,702	19,083	19,624	32,834	46,853	49,301	30,423	42,143	51,071
SK hynix	6,818	7,162	5,204	6,522	8,705	4,294	10,034	17,314	28,503	37,493	45,986	26,409	37,493	45,986
Micron Technology	4,400	4,000	3,250	5,000	5,626	3,300	6,367	14,793	29,999	41,650	50,000	23,200	30,800	37,500
Others	1,799	1,282	1,741	2,949	5,339	6,553	10,500	8,789	12,091	20,678	17,431	11,400	14,800	17,000
Total	**24,836**	**19,735**	**19,399**	**28,479**	**33,323**	**30,849**	**45,984**	**60,719**	**103,427**	**146,674**	**162,718**	**91,432**	**125,036**	**151,557**
Y/Y % changes	*78%*	*-21%*	*-2%*	*47%*	*17%*	*-7%*	*49%*	*32%*	*70%*	*42%*	*11%*	*54%*	*37%*	*21%*
NAND														
Samsung	6,364	6,605	9,494	10,931	9,577	8,798	5,652	5,483	5,784	6,993	8,042	6,223	7,143	8,214
SK hynix	7,569	4,632	3,303	4,268	5,733	1,936	1,463	1,548	2,818	3,252	5,734	2,611	3,211	5,418
Micron Technology	4,996	3,981	3,500	4,700	5,000	3,000	3,429	3,247	5,714	7,350	8,200	4,300	5,000	7,000
Kioxia/SanDisk	5,200	5,500	5,800	5,800	6,000	5,300	2,300	3,450	5,100	5,600	6,100	5,000	5,500	6,100
Intel	2,763	2,951	750	650	1,000	770	720	600	0	0	0	0	0	0
YMTC	3,000	2,457	2,200	2,960	3,500	3,143	4,573	5,337	6,000	7,000	10,000	5,300	6,500	7,500
Total	**29,891**	**26,126**	**25,047**	**29,309**	**30,910**	**22,947**	**18,136**	**19,665**	**25,416**	**30,195**	**38,076**	**23,434**	**27,354**	**34,232**
Y/Y % changes	*5%*	*-13%*	*-4%*	*17%*	*5%*	*-26%*	*-21%*	*8%*	*29%*	*19%*	*26%*	*30%*	*17%*	*25%*
Grand Total	**89,818**	**90,126**	**96,062**	**134,609**	**161,835**	**149,333**	**151,901**	**158,289**	**249,444**	**320,770**	**350,221**	**226,887**	**273,302**	**316,398**
Y/Y % changes	*13%*	*0%*	*7%*	*40%*	*20%*	*-8%*	*2%*	*4%*	*58%*	*29%*	*9%*	*36%*	*20%*	*16%*
WFE %Capex	*66%*	*62%*	*68%*	*69%*	*62%*	*69%*	*74%*	*79%*	*65%*	*70%*	*75%*	*70%*	*75%*	*75%*
WFE estimates	**58,944**	**55,480**	**64,905**	**92,335**	**101,101**	**102,820**	**111,777**	**124,452**	**162,500**	**224,500**	**262,700**	**158,800**	**205,000**	**237,300**
Y/Y % changes		*-6%*	*17%*	*42%*	*9%*	*2%*	*9%*	*11%*	*31%*	*38%*	*17%*	*28%*	*29%*	*16%*

Source: Company data, Gartner®, J.P. Morgan estimates.

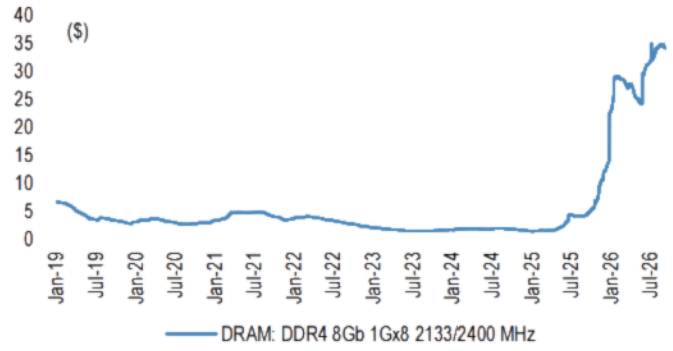
JPMorgan Securities Japan Co., Ltd.
Mio Shikanai AC
(81-3) 6736 1313
mio.shikanai@jpmorgan.com

Figure 22: Semiconductor shipments, SPE shipments, and SPE ratio trend

CY (US$mn)	Semiconductor (Global)		SPE (Global)		SPE/Semi
	Shipment	YoY	Shipment	YoY	Ratio (%)
2025	791,694	26.1%	120,826	1.8%	15.3%
2024	627,635	19.1%	118,737	8.6%	18.9%
2023	526,828	-8.1%	109,360	1.7%	20.8%
2022	573,477	3.4%	107,532	4.8%	18.8%
2021	554,677	26.0%	102,641	44.5%	18.5%
2020	440,389	6.8%	71,028	18.9%	16.1%
2019	412,307	-12.0%	59,753	-7.4%	14.5%
2018	468,778	13.7%	64,494	13.8%	13.8%
2017	412,221	21.6%	56,687	38.2%	13.8%
2016	338,931	1.2%	41,007	12.3%	12.1%
2015	335,007	-0.2%	36,527	-2.4%	10.9%
2014	335,843	9.8%	37,410	18.5%	11.1%
2013	305,952	4.9%	31,580	-14.8%	10.3%
2012	291,562	-2.7%	37,078	-14.8%	12.7%
2011	299,521	0.4%	43,526	9.0%	14.5%
2010	298,315	31.8%	39,929	151.1%	13.4%
2009	226,313	-9.0%	15,900	-46.4%	7.0%
2008	248,603	-2.8%	29,664	-31.5%	11.9%
2007	255,645	3.2%	43,316	7.0%	16.9%
2006	247,716	8.9%	40,474	23.1%	16.3%
2005	227,484	6.8%	32,882	-11.3%	14.5%
2004	213,027	28.0%	37,081	67.1%	17.4%
2003	166,426	18.3%	22,189	12.4%	13.3%
2002	140,713	1.3%	19,749	-29.6%	14.0%
2001	138,963	-32.0%	28,038	-41.2%	20.2%
2000	204,394	36.8%	47,680	87.0%	23.3%
1999	149,379	18.9%	25,497	18.4%	17.1%
1998	125,612	-7.4%	21,531	-22.0%	17.1%
1997	135,609	4.2%	27,588	4.7%	20.3%
1996	130,104	-9.9%	26,337	9.6%	20.2%
1995	144,404	41.7%	24,027	65.6%	16.6%
1994	101,879	31.8%	14,507	40.1%	14.2%
1993	77,310	29.1%	10,352	28.3%	13.4%
1992	59,865	9.6%	8,067	-9.3%	13.5%

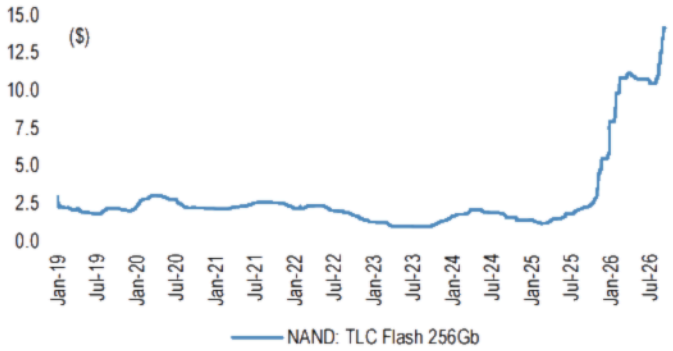
Source: WSTS, SEMI, J.P. Morgan.

Figure 23: DRAM spot price trend



Source: Bloomberg Finance L.P., J.P. Morgan.

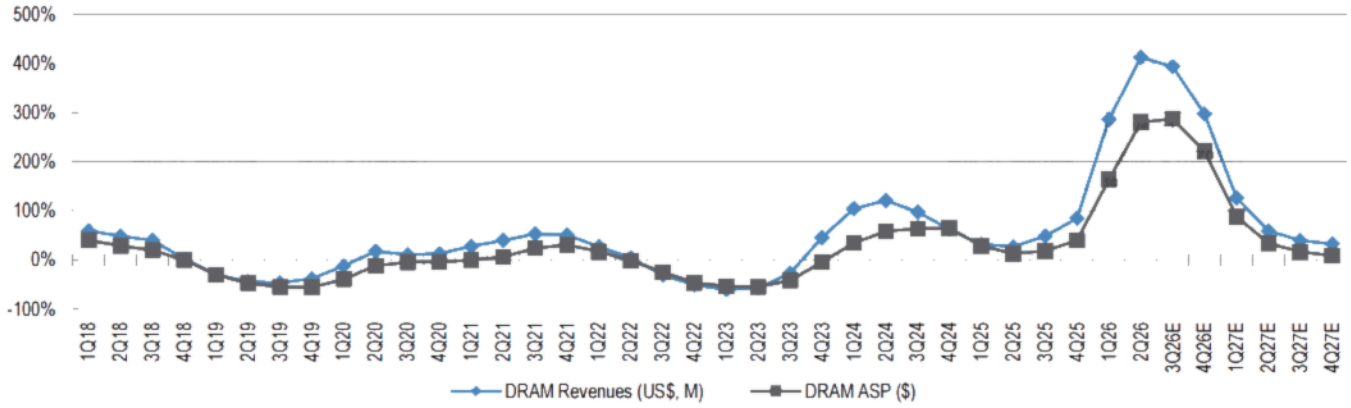
Figure 24: NAND spot price trend



Source: Bloomberg Finance L.P., J.P. Morgan.

JPMorgan Securities Japan Co., Ltd.
Mio Shikanai AC
(81-3) 6736 1313
mio.shikanai@jpmorgan.com

Figure 25: DRAM quarterly growth rate (YoY)



Source: WSTS, Gartner®, J.P. Morgan estimates.
Note: J.P. Morgan Global Memory Model.

Figure 26: DRAM supply/demand forecasts

	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026E	2027E	2028E
DRAM Demand (mn units)	**8,992**	**11,166**	**13,651**	**15,928**	**19,376**	**22,957**	**23,596**	**25,784**	**31,350**	**37,912**	**49,235**	**64,491**	**80,551**
YoY (%)	27%	24%	22%	17%	22%	18%	3%	9%	22%	21%	30%	31%	25%
DRAM Supply (mn units)	**9,525**	**11,410**	**13,056**	**15,689**	**19,248**	**23,630**	**23,665**	**27,283**	**32,341**	**38,500**	**48,689**	**60,552**	**75,596**
YoY (%)	33%	20%	14%	20%	23%	23%	0%	15%	19%	19%	26%	24%	25%
DRAM ASP ($)	**4.33**	**6.40**	**7.69**	**3.94**	**3.32**	**3.84**	**3.28**	**1.88**	**2.90**	**3.69**	**12.40**	**16.01**	**17.17**
YoY (%)	-34%	48%	20%	-49%	-16%	15%	-15%	-43%	54%	27%	236%	29%	7%

Source: iSuppli, Gartner®, WSTS, J.P. Morgan estimates.
Note: 8GB equivalent for DRAM. J.P. Morgan Global Memory Model.

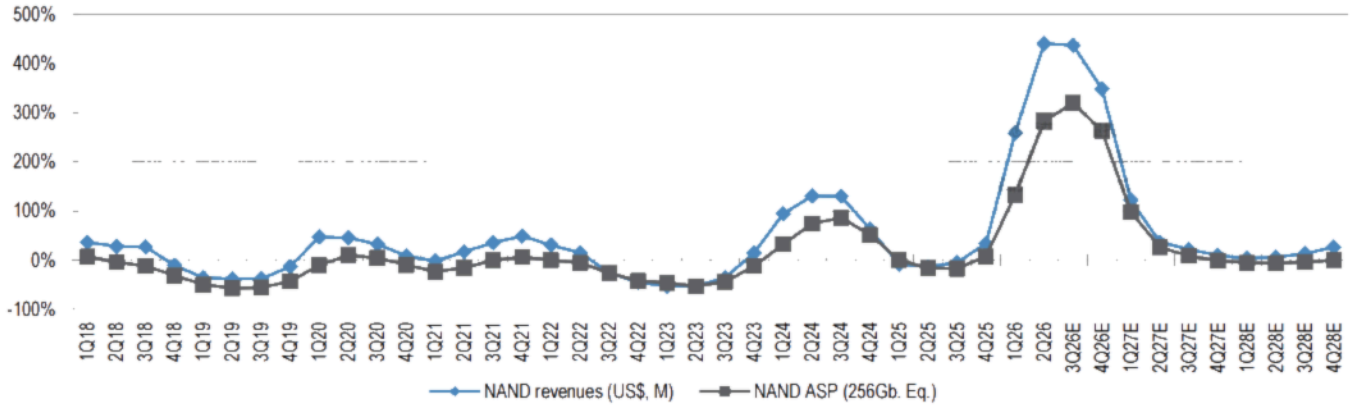
Figure 27: DRAM (8GB): Quarterly forecasts

	2024				2025				2026				2027				2028			
	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q25	3QE	4QE	1QE	2QE	3QE	4QE	1QE	2QE	3QE	4QE
DRAM (8GB Eq.)																				
Volume (consumption) (WSTS) (mn units)	7,803	8,323	8,276	8,267	8,027	9,357	10,382	10,916	11,751	12,628	13,229	13,525	14,120	15,000	15,819	16,473	17,633	18,728	19,662	20,305
YoY (%)	52%	39%	20%	-1%	3%	12%	25%	32%	46%	35%	27%	24%	20%	19%	20%	22%	25%	25%	24%	23%
Revenue (US$ mn)	18,811	22,937	25,126	27,890	24,773	29,104	37,352	51,478	95,772	149,232	184,482	204,637	216,853	237,269	257,736	271,071	293,060	317,493	341,660	358,115
YoY (%)	104%	121%	97%	62%	32%	27%	49%	85%	287%	413%	394%	298%	126%	59%	40%	32%	35%	34%	33%	32%
ASP ($)	2.41	2.76	3.04	3.37	3.09	3.11	3.60	4.72	8.15	11.82	13.95	15.13	15.36	15.82	16.29	16.46	16.62	16.95	17.38	17.64
YoY (%)	35%	58%	64%	64%	28%	13%	19%	40%	164%	280%	288%	221%	88%	34%	17%	9%	8%	7%	7%	7%

Source: iSuppli, Gartner®, WSTS, J.P. Morgan estimates
Note: J.P. Morgan Global Memory Model.

JPMorgan Securities Japan Co., Ltd.
Mio Shikanai AC
(81-3) 6736 1313
mio.shikanai@jpmorgan.com

Figure 28: NAND quarterly growth rate (YoY)



Source: iSuppli, Gartner®, WSTS, J.P. Morgan estimates.
Note: 256GB equivalent for NAND. J.P. Morgan Global Memory Model.

Figure 29: NAND supply/demand forecasts

	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026E	2027E	2028E
NAND Demand (mn units)	**4,287**	**5,558**	**7,269**	**10,413**	**14,220**	**18,797**	**19,637**	**21,440**	**25,746**	**30,591**	**37,035**	**47,112**	**57,043**
YoY (%)	38%	30%	31%	43%	37%	32%	4%	9%	20%	19%	21%	27%	21%
NAND Supply (mn units)	**4,192**	**5,388**	**7,389**	**10,785**	**13,934**	**19,472**	**21,432**	**23,651**	**27,060**	**30,845**	**37,302**	**45,650**	**55,062**
YoY (%)	45%	29%	37%	46%	29%	40%	10%	10%	14%	14%	21%	22%	21%
NAND ASP ($)	**7.80**	**8.78**	**7.71**	**3.68**	**3.64**	**3.33**	**2.70**	**1.57**	**2.50**	**2.34**	**8.21**	**10.07**	**9.64**
YoY (%)	-24%	12%	-12%	-52%	-1%	-8%	-19%	-42%	60%	-6%	251%	23%	-4%

Source: WSTS, Gartner®, J.P. Morgan estimates.
Note: J.P. Morgan Global Memory Model.

Figure 30: NAND (256GB): Quarterly forecasts

	2024				2025				2026				2027				2028			
	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q25	3QE	4QE	1QE	2QE	3QE	4QE	1QE	2QE	3QE	4QE
NAND (256GB Eq.)																				
Volume (consumption) (WSTS) (mn units)	6,837	7,026	7,058	6,914	6,254	7,317	8,120	8,652	9,603	10,345	10,396	10,675	10,768	11,206	11,691	11,878	11,816	12,781	13,885	15,046
YoY (%)	47%	33%	23%	8%	-9%	4%	15%	25%	54%	41%	28%	23%	12%	8%	12%	11%	10%	14%	19%	27%
Revenue (US$ mn)	14,819	17,991	19,083	17,799	13,626	15,558	18,077	23,815	48,786	84,087	97,175	106,770	108,233	114,895	118,862	116,943	112,264	121,733	134,238	147,643
YoY (%)	94%	130%	130%	63%	-8%	-14%	-5%	34%	258%	440%	438%	348%	122%	37%	22%	10%	4%	6%	13%	26%
ASP ($)	2.17	2.56	2.70	2.57	2.18	2.13	2.23	2.75	5.08	8.13	9.35	10.00	10.05	10.25	10.15	9.85	9.50	9.52	9.67	9.81
YoY (%)	32%	74%	87%	51%	1%	-17%	-18%	7%	133%	282%	320%	263%	98%	26%	9%	-2%	-5%	-7%	-5%	0%

Source: iSuppli, Gartner®, WSTS, J.P. Morgan estimates
Note: J.P. Morgan Global Memory Model.

Figure 31: DRAM (8GB) yearly forecasts

	2018	2019	2020	2021	2022	2023	2024	2025	2026E	2027E	2028E
DRAM (8GB Eq.)											
Volume (consumption) (WSTS) (mn units)	**12,983**	**15,149**	**19,112**	**23,716**	**23,470**	**26,378**	**32,669**	**38,682**	**51,132**	**61,412**	**76,328**
YoY (%)	12%	17%	26%	24%	-1%	12%	24%	18%	32%	20%	24%
Revenue (US$ mn)	**99,780**	**59,664**	**63,522**	**91,034**	**76,886**	**49,536**	**94,764**	**142,707**	**634,123**	**982,929**	**1,310,328**
YoY (%)	34%	-40%	6%	43%	-16%	-36%	91%	51%	344%	55%	33%
ASP ($)	**7.69**	**3.94**	**3.32**	**3.84**	**3.28**	**1.88**	**2.90**	**3.69**	**12.40**	**16.01**	**17.17**
YoY (%)	20%	-49%	-16%	15%	-15%	-43%	54%	27%	236%	29%	7%

Source: iSuppli, Gartner®, WSTS, J.P. Morgan estimates
Note: J.P. Morgan Global Memory Model.

Figure 32: DRAM (8GB) demand model by use

	2018	2019	2020	2021	2022	2023	2024	2025	2026E	2027E	2028E
Volume (Demand; mn units)											
PC DRAM	2,953	3,067	3,448	4,354	4,526	4,675	5,332	5,905	5,571	5,369	5,282
Desktop	510	577	517	629	620	587	617	732	666	644	649
Notebooks	967	1,082	1,510	2,045	1,856	1,827	2,050	2,354	2,192	2,167	2,177
Upgrades + other EDP	1,477	1,408	1,420	1,680	2,050	2,260	2,665	2,819	2,713	2,558	2,456
Server	3,423	3,720	5,964	6,912	7,447	7,803	10,911	14,520	26,557	42,348	58,806
Mobile DRAM	5,312	6,840	7,471	8,844	8,648	9,198	10,683	12,201	10,863	10,458	10,233
Others	1,962	1,999	2,123	2,624	3,103	3,588	4,070	4,526	4,815	5,033	5,269
Total	13,650	15,626	19,007	22,734	23,724	25,264	30,997	37,152	47,807	63,209	79,590
YoY											
PC DRAM	5%	4%	12%	26%	4%	3%	14%	11%	-6%	-4%	-2%
Desktop	1%	13%	-10%	22%	-1%	-5%	5%	19%	-9%	-3%	1%
Notebooks	5%	12%	40%	35%	-9%	-2%	12%	15%	-7%	-1%	0%
Upgrades + other EDP	7%	-5%	1%	18%	22%	10%	18%	6%	-4%	-6%	-4%
Server	54%	9%	60%	16%	8%	5%	40%	33%	83%	59%	39%
Mobile DRAM	24%	29%	9%	18%	-2%	6%	16%	14%	-11%	-4%	-2%
Others	21%	2%	6%	24%	18%	16%	13%	11%	6%	5%	5%
Total	25%	14%	22%	20%	4%	6%	23%	20%	29%	32%	26%
Composition ratio											
PC DRAM	22%	20%	18%	19%	19%	19%	17%	16%	12%	8%	7%
Desktop	4%	4%	3%	3%	3%	2%	2%	2%	1%	1%	1%
Notebooks	7%	7%	8%	9%	8%	7%	7%	6%	5%	3%	3%
Upgrades + other EDP	11%	9%	7%	7%	9%	9%	9%	8%	6%	4%	3%
Server	25%	24%	31%	30%	31%	31%	35%	39%	56%	67%	74%
Mobile DRAM	0%	0%	0%	0%	0%	1%	4%	6%	8%	10%	11%
Others	39%	44%	39%	39%	36%	36%	34%	33%	23%	17%	13%
Total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

Source: iSuppli, Gartner®, WSTS, J.P. Morgan estimates
Note: J.P. Morgan Global Memory Model.

JPMorgan Securities Japan Co., Ltd.
Mio Shikanai AC
(81-3) 6736 1313
mio.shikanai@jpmorgan.com

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Figure 33: NAND (256GB): Yearly forecasts

	2018	2019	2020	2021	2022	2023	2024	2025	2026E	2027E	2028E
NAND (256GB Eq.)											
Volume (consumption) (WSTS) (mn units)	**7,212**	**10,283**	**13,669**	**18,570**	**20,500**	**22,095**	**27,836**	**30,343**	**41,020**	**45,542**	**53,528**
YoY (%)	34%	43%	33%	36%	10%	8%	26%	9%	35%	11%	18%
Revenue (US$ mn)	**55,631**	**37,808**	**49,792**	**61,914**	**55,290**	**34,652**	**69,691**	**71,077**	**336,818**	**458,733**	**515,878**
YoY (%)	18%	-32%	32%	24%	-11%	-37%	101%	2%	374%	36%	12%
ASP ($)	**7.71**	**3.68**	**3.64**	**3.33**	**2.70**	**1.57**	**2.50**	**2.34**	**8.21**	**10.07**	**9.64**
YoY (%)	-12%	-52%	-1%	-8%	-19%	-42%	60%	-6%	251%	23%	-4%

Source: iSuppli, Gartner®, WSTS, J.P. Morgan estimates
Note: J.P. Morgan Global Memory Model.

Figure 34: NAND (256GB) demand model by use

	2018	2019	2020	2021	2022	2023	2024	2025	2026E	2027E	2028E
Volume (Demand; mn units)											
USB	367	407	422	489	523	550	564	639	652	657	683
Flash cards	503	568	510	538	520	541	529	586	603	620	639
SSDs	2,840	4,576	7,056	9,464	10,240	10,279	13,769	16,335	23,107	33,125	43,046
Enterprise SSD	1,272	1,758	2,939	3,950	4,743	3,194	7,344	8,934	16,280	25,798	35,401
Client SSD/Others	1,568	2,818	4,117	5,514	5,497	7,085	6,424	7,400	6,827	7,328	7,645
Smartphones	2,586	3,472	4,004	5,831	5,961	6,891	7,607	8,761	8,321	7,843	7,850
Tablets	239	325	548	706	723	722	850	926	843	817	850
Feature phones	4	4	5	7	8	8	8	9	8	8	8
Others	559	883	1,147	1,515	1,824	2,021	2,310	2,603	2,832	3,072	3,340
Total	**7,099**	**10,236**	**13,693**	**18,550**	**19,800**	**21,011**	**25,636**	**29,858**	**36,366**	**46,144**	**56,415**
YoY											
USB	34%	43%	33%	36%	10%	8%	26%	9%	35%	11%	18%
Flash cards	18%	-32%	32%	24%	-11%	-37%	101%	2%	374%	36%	12%
SSDs	43%	61%	54%	34%	8%	0%	34%	19%	41%	43%	30%
Enterprise SSD											
Client SSD/Others											
Smartphones	44%	34%	15%	46%	2%	16%	10%	15%	-5%	-6%	0%
Tablets	-2%	36%	69%	29%	2%	0%	18%	9%	-9%	-3%	4%
Feature phones	-5%	14%	26%	36%	13%	-4%	3%	9%	-10%	0%	0%
Others	14%	58%	30%	32%	20%	11%	14%	13%	9%	8%	9%
Total	**31%**	**44%**	**34%**	**35%**	**7%**	**6%**	**22%**	**16%**	**22%**	**27%**	**22%**
Composition ratio											
USB	5%	4%	3%	3%	3%	3%	2%	2%	2%	1%	1%
Flash cards	7%	6%	4%	3%	3%	3%	2%	2%	2%	1%	1%
SSDs	40%	45%	52%	51%	52%	49%	54%	55%	64%	72%	76%
Enterprise SSD	18%	17%	21%	21%	24%	15%	29%	30%	45%	56%	63%
Client SSD/Others	22%	28%	30%	30%	28%	34%	25%	25%	19%	16%	14%
Smartphones	36%	34%	29%	31%	30%	33%	30%	29%	23%	17%	14%
Tablets	3%	3%	4%	4%	4%	3%	3%	3%	2%	2%	2%
Feature phones	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Others	8%	9%	8%	8%	9%	10%	9%	9%	8%	7%	6%
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Source: iSuppli, Gartner®, WSTS, J.P. Morgan estimates
Note: J.P. Morgan Global Memory Model.

JPMorgan Securities Japan Co., Ltd.
Mio Shikanai AC
(81-3) 6736 1313
mio.shikanai@jpmorgan.com

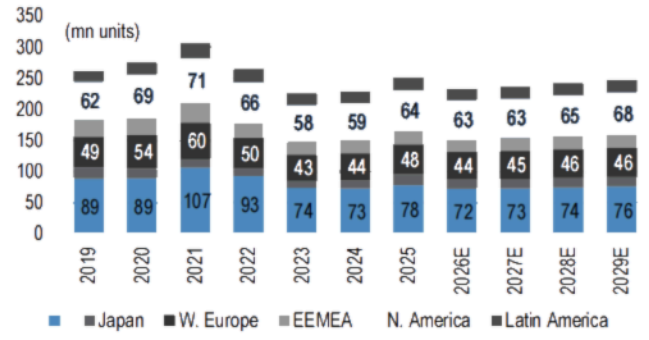
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Figure 35: End products: Market assumptions

(mn unit, %)	CY2018	CY2019	CY2020	CY2021	CY2022	CY2023	CY2024	CY2025	CY2026E	CY2027E	CY2028E	Estimated by
Desktop PC	**100**	**100**	**80**	**85**	**76**	**62**	**61**	**68**	**63**	**64**	**66**	**Albert Hung**
YoY	-2.5	0.5	-20.4	6.9	-10.9	-17.9	-2.2	11.8	-8.1	1.2	4.2	
Notebook PC	**160**	**162**	**196**	**221**	**189**	**163**	**168**	**183**	**170**	**173**	**176**	**Albert Hung**
YoY	-0.3	1.3	20.9	13.0	-14.6	-13.5	3.1	8.5	-6.9	1.9	1.5	
Server	**13**	**13**	**13**	**13**	**14**	**11**	**12**	**13**	**15**	**19**	**23**	**Albert Hung**
YoY	13.1	-3.2	1.1	1.9	7.0	-17.9	6.5	3.8	22.2	25.0	18.5	
Automotive	**94**	**90**	**77**	**80**	**79**	**87**	**89**	**92**	**88**	**90**	**91**	**Akira Kishimoto**
YoY	-0.6	-4.2	-14.1	4.0	-1.6	9.8	2.3	3.4	-3.9	2.1	1.3	
iPhone	**205**	**195**	**201**	**246**	**231**	**228**	**228**	**241**	**244**	**240**	**241**	**Samik Chatterjee**
YoY	-5.1	-4.6	2.8	22.4	-5.9	-1.3	-0.2	5.6	1.3	-1.5	0.2	
Apple Watch	**25**	**31**	**39**	**40**	**46**	**43**	**40**	**38**	**39**	**39**	**--**	**Samik Chatterjee**
YoY	39.7	26.8	25.0	1.6	16.7	-6.9	-8.1	-3.2	1.0	1.0	--	
LCD TV	**289**	**287**	**272**	**261**	**263**	**236**	**--**	**--**	**--**	**--**	**--**	**--**
YoY	--	-0.4	-5.4	-3.9	0.6	-10.0	--	--	--	--	--	
OLED TV	**3**	**3**	**4**	**7**	**7**	**5**	**--**	**--**	**--**	**--**	**--**	**--**
YoY	--	11.5	35.8	65.9	0.5	-29.0	--	--	--	--	--	
Smartphone	**1,410**	**1,387**	**1,265**	**1,351**	**1,193**	**1,142**	**1,223**	**1,245**	**1,104**	**1,075**	**--**	**Samik Chatterjee**
YoY	-2.4	-1.7	-8.8	6.9	-11.7	-4.3	7.1	1.8	-11.3	-2.6	--	
DSLR	**10.8**	**8.5**	**5.3**	**5.4**	**5.9**	**6.0**	**6.6**	**7.0**	**--**	**--**	**--**	**--**
YoY	-7.8	-21.4	-37.3	0.9	10.7	1.2	10.2	5.9	--	--	--	

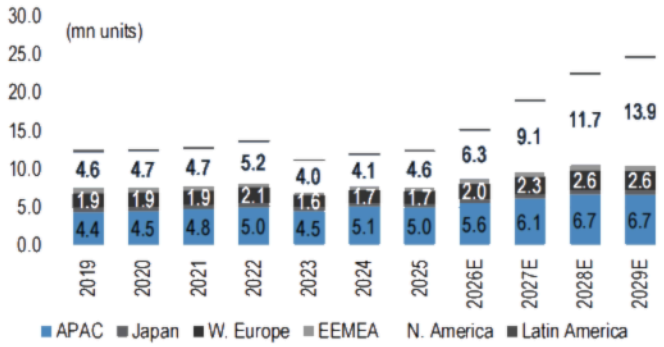
Source: Omdia, CIPA, company data, and J.P. Morgan estimates.
Note: Apple as of July 31, 2026, Smartphone as of March 9, 2026, PC/Server as of July 15, 2026, Automotive as of August 18, 2026.

Figure 36: PC shipments by region



Source: Gartner®, J.P. Morgan estimates.

Figure 37: Server shipments by region



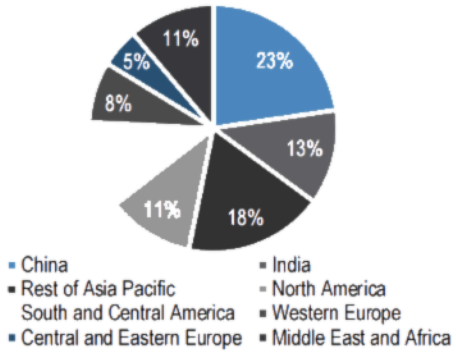
Source: Gartner®, J.P. Morgan estimates.

Figure 38: Smartphone volume trend by region

Millions of units	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026E	2027E
China	439.2	390.8	360.8	330.3	332.9	287.3	272.5	284.6	282.3	254.1	238.8
India	122.7	140.1	158.3	144.7	161.5	151.6	148.6	155.9	154.2	137.3	140.3
Rest of Asia Pacific	211.4	221.2	214.5	217.4	234.5	210.9	193.4	220.1	225.8	197.8	189.8
North America	180.1	166.7	159.4	151.0	163.1	148.9	135.2	136.6	141.2	129.9	127.3
South and Central America	125.5	115.2	110.2	107.6	129.4	116.5	118.9	137.0	140.5	125.9	119.6
Western Europe	119.4	121.0	119.8	126.2	114.0	104.7	94.2	99.0	98.7	88.3	84.8
Central and Eastern Europe	94.1	92.4	92.5	86.0	87.6	70.4	67.9	66.8	63.5	56.8	55.7
Middle East and Africa	152.1	162.2	171.0	101.7	128.3	103.0	111.2	123.1	139.3	114.2	118.8
Total	**1,444.5**	**1,409.7**	**1,386.5**	**1,264.7**	**1,351.4**	**1,193.4**	**1,141.9**	**1,223.2**	**1,245.5**	**1,104.3**	**1,075.1**
Y/Y Growth											
China	-7.7%	-11.0%	-8%	-8%	1%	-14%	-5%	4%	-1%	-10%	-6%
India	22.0%	14.2%	13%	-9%	12%	-6%	-2%	5%	-1%	-11%	2%
Rest of Asia Pacific	11.5%	4.7%	-3%	1%	8%	-10%	-8%	14%	3%	-12%	-4%
North America	2.2%	-7.5%	-4%	-5%	8%	-9%	-9%	1%	3%	-8%	-2%
South and Central America	8.3%	-8.2%	-4%	-2%	20%	-10%	2%	15%	3%	-10%	-5%
Western Europe	5.8%	1.4%	-1%	5%	-10%	-8%	-10%	5%	0%	-10%	-4%
Central and Eastern Europe	2.8%	-1.8%	0%	-7%	2%	-20%	-4%	-2%	-5%	-11%	-2%
Middle East and Africa	10.3%	6.7%	5%	-41%	26%	-20%	8%	11%	13%	-18%	4%
Total	**3.2%**	**-2.4%**	**-2%**	**-9%**	**7%**	**-12%**	**-4%**	**7%**	**2%**	**-11%**	**-3%**

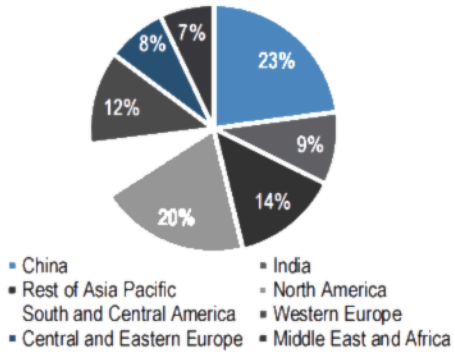
Source: Omdia, J.P. Morgan estimates
Note: J.P. Morgan smartphone model.

Figure 39: Smartphone shipment volume by region (2024, volume)



Source: Omdia, J.P. Morgan.

Figure 40: Smartphone market value mix by region (2024, value)



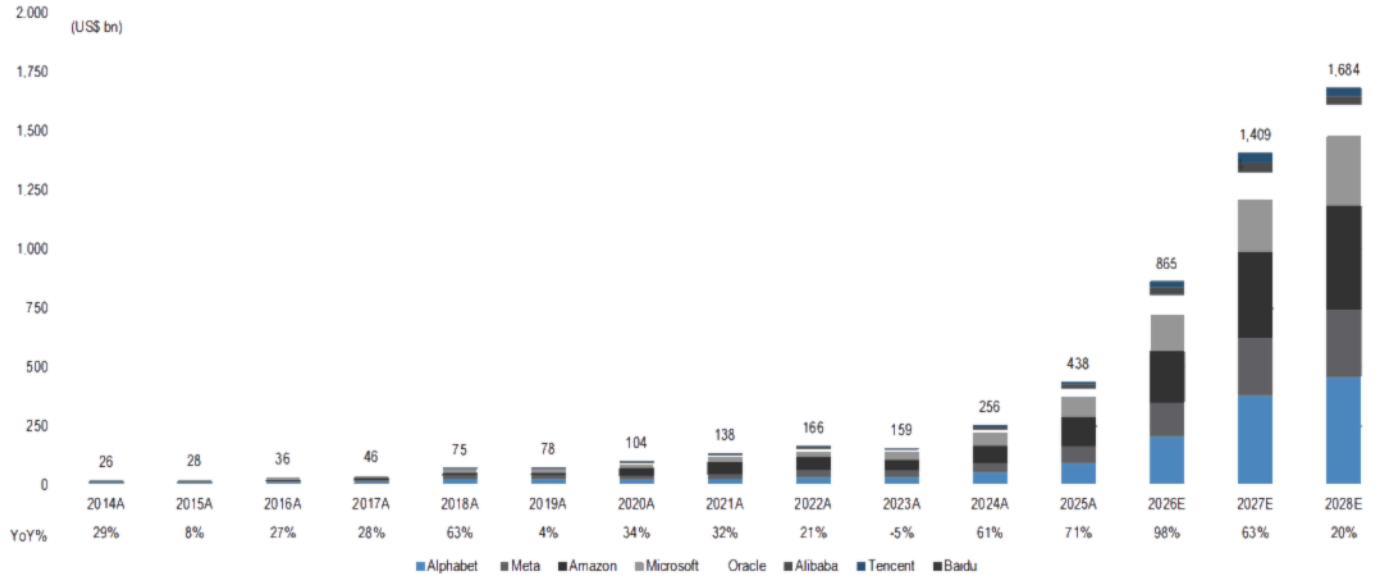
Source: IDC, Omdia, J.P. Morgan.

Figure 41: iPhone forecasts

FY (US$ mn)	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025E	2026E	2027E	2028E
Revenue	**136,700**	**141,319**	**164,888**	**142,381**	**137,781**	**191,973**	**205,489**	**200,583**	**201,183**	**209,586**	**252,661**	**269,780**	**261,953**
YoY (%)	-11.8%	3.4%	16.7%	-13.6%	-3.2%	39.3%	7.0%	-2.4%	0.3%	4.2%	20.6%	6.8%	-2.9%
Units ('000s)	**211,884**	**216,756**	**217,722**	**189,537**	**189,989**	**241,460**	**242,790**	**223,500**	**229,461**	**233,399**	**254,598**	**241,870**	**240,190**
YoY (%)	-8.4%	2.3%	0.4%	-12.9%	0.2%	27.1%	0.6%	-7.9%	2.7%	1.7%	9.1%	-5.0%	-0.7%
ASP ($)	**645**	**652**	**757**	**751**	**725**	**795**	**846**	**897**	**877**	**898**	**992**	**1,115**	**1,091**
YoY (%)	-3.8%	1.1%	16.2%	-0.8%	-3.5%	9.6%	6.5%	6.0%	-2.3%	2.4%	10.5%	12.4%	-2.2%

Source: Company data, J.P. Morgan estimates (Apple covered by Samik Chatterjee, forecasts as of July 31, 2026).
Note: Apple's fiscal year ends in September, fiscal year basis.

Figure 42: 8CSP (top 8 cloud service providers) capex forecasts



Source: Company data, J.P. Morgan estimates (Alphabet, Meta, Amazon covered by Doug Anmuth; Microsoft, Oracle covered by Samik Chatterjee; Alibaba, Tencent, Baidu covered by Alex Yao).
Note: Estimates as of September 2026.

Figure 43: 8CSP (top 8 cloud service providers) capex forecasts

$bn	Alphabet	Meta	Amazon	Microsoft	Oracle	Alibaba	Tencent	Baidu	Total	YoY
2014A	10.96	1.83	4.89	5.29	0.73	1.25	0.70	0.78	26.43	29%
2015A	9.93	2.52	4.59	6.55	1.61	1.73	0.87	0.83	28.62	8%
2016A	10.21	4.49	6.74	9.11	1.60	2.64	1.26	0.63	36.69	28%
2017A	13.18	6.73	10.06	8.70	2.04	4.42	1.79	0.71	47.62	30%
2018A	25.14	13.98	11.32	14.22	1.47	7.50	2.98	1.33	77.94	64%
2019A	23.55	15.10	12.69	13.55	1.59	6.57	3.30	0.93	77.28	-1%
2020A	22.28	15.12	35.05	17.59	1.83	6.26	4.94	0.74	103.80	34%
2021A	24.64	18.57	55.40	23.22	3.12	8.27	4.54	1.69	139.44	34%
2022A	31.49	31.19	58.32	24.77	6.68	5.10	3.37	1.23	162.14	16%
2023A	32.25	27.05	48.13	35.20	6.94	4.65	2.96	1.58	158.76	-2%
2024A	52.54	37.26	77.66	55.55	10.75	11.94	8.74	1.13	255.56	61%
2025A	91.45	69.69	128.32	83.09	35.48	17.54	12.17	1.68	439.43	72%
2026E	204.72	142.50	221.49	157.87	78.13	30.32	27.28	2.65	864.96	97%
2027E	378.31	242.69	365.25	227.84	109.00	40.90	42.21	2.66	1,408.86	63%
2028E	455.80	283.54	445.11	295.61	130.00	36.02	35.68	2.25	1,684.01	20%

Source: Company data, J.P. Morgan estimates (Alphabet, Meta, Amazon covered by Doug Anmuth; Microsoft, Oracle covered by Samik Chatterjee; Alibaba, Tencent, Baidu covered by Alex Yao).
Note: Estimates as of September 2026.

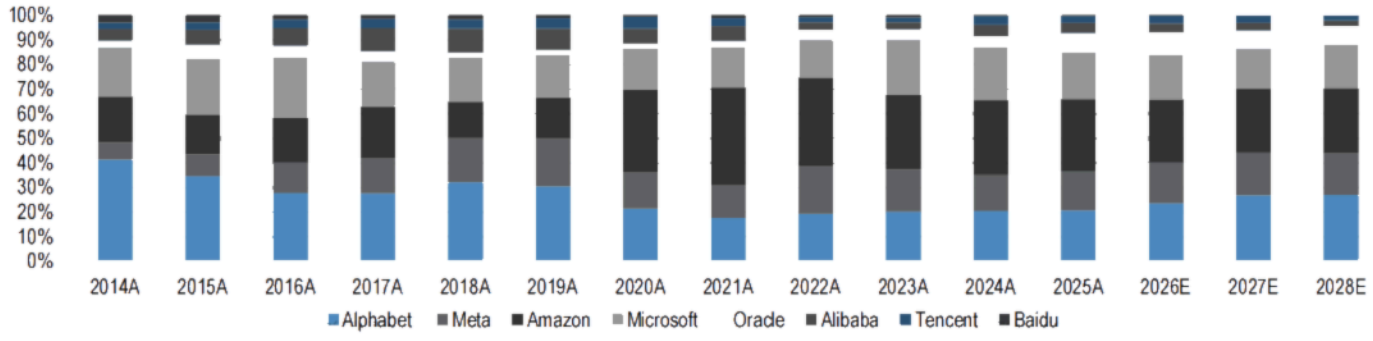
JPMorgan Securities Japan Co., Ltd.
Mio Shikanai AC
(81-3) 6736 1313
mio.shikanai@jpmorgan.com

Figure 44: CSP (cloud service providers) capex forecasts

$bn	Alphabet	Meta	Amazon	Microsoft	Oracle	Total	YoY
2022Q1A	9.79	5.32	13.74	5.34	1.10	34.18	29%
2022Q2A	6.83	7.53	14.10	6.87	1.42	35.33	20%
2022Q3A	7.28	9.36	15.04	6.28	1.72	37.96	20%
2022Q4A	7.60	8.99	15.44	6.27	2.43	38.30	12%
2022A	**31.49**	**31.19**	**58.32**	**24.77**	**6.68**	**145.76**	**20%**
2023Q1A	6.29	6.82	13.07	6.61	2.63	32.79	-4%
2023Q2A	6.89	6.13	10.41	8.94	1.91	32.38	-8%
2023Q3A	8.06	6.50	11.30	9.92	1.31	35.77	-6%
2023Q4A	11.02	7.59	13.35	9.74	1.08	41.70	9%
2023A	**32.25**	**27.05**	**48.13**	**35.20**	**6.94**	**142.63**	**-2%**
2024Q1A	12.01	6.40	13.94	10.95	1.67	43.30	32%
2024Q2A	13.19	8.17	16.39	13.87	2.80	51.63	59%
2024Q3A	13.06	8.26	21.28	14.92	2.30	57.52	61%
2024Q4A	14.28	14.43	26.05	15.80	3.97	70.56	69%
2024A	**52.54**	**37.26**	**77.66**	**55.55**	**10.75**	**223.00**	**56%**
2025Q1A	17.20	12.94	24.26	16.75	5.86	71.14	64%
2025Q2A	22.45	16.54	31.37	17.08	9.08	87.43	69%
2025Q3A	23.95	18.83	34.23	19.39	8.50	96.40	68%
2025Q4A	27.85	21.38	38.47	29.88	12.03	117.58	67%
2025A	**91.45**	**69.69**	**128.32**	**83.09**	**35.48**	**372.55**	**67%**
2026E	**204.72**	**142.50**	**221.49**	**157.87**	**78.13**	**726.58**	**95%**
2027E	**378.31**	**242.69**	**365.25**	**227.84**	**109.00**	**1,214.08**	**67%**
2028E	**455.80**	**283.54**	**445.11**	**295.61**	**130.00**	**1,480.06**	**22%**

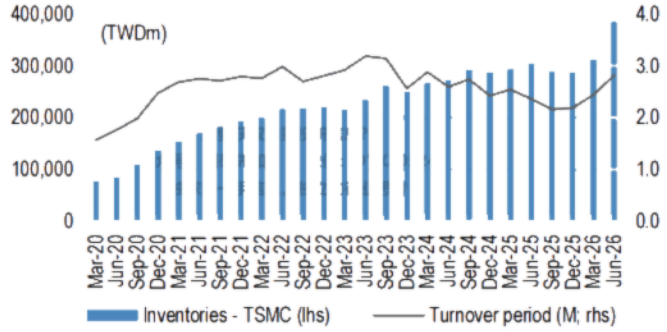
Source: Company data, J.P. Morgan estimates (Alphabet, Meta, Amazon covered by Doug Anmuth; Microsoft, Oracle covered by Samik Chatterjee).
Note: Estimates as of September 2026.

Figure 45: 8CSP (top 8 cloud service providers) capex breakdown



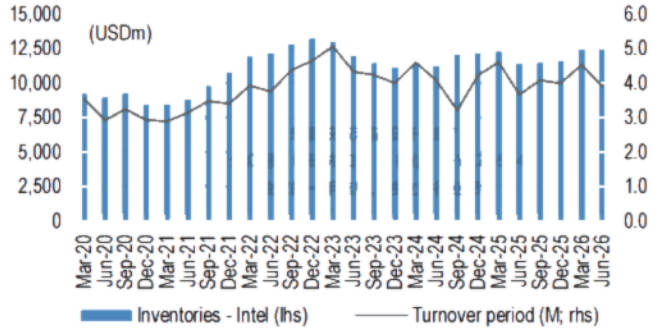
Source: Company data, J.P. Morgan estimates (Alphabet, Meta, Amazon covered by Doug Anmuth; Microsoft, Oracle covered by Samik Chatterjee; Alibaba, Tencent, Baidu covered by Alex Yao).
Note: Estimates as of September 2026.

Figure 46: Inventory trend (TSMC)



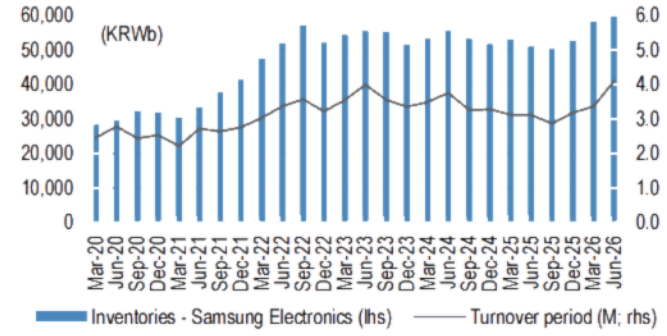
Source: Company reports, J.P. Morgan.

Figure 47: Inventory trend (Intel)



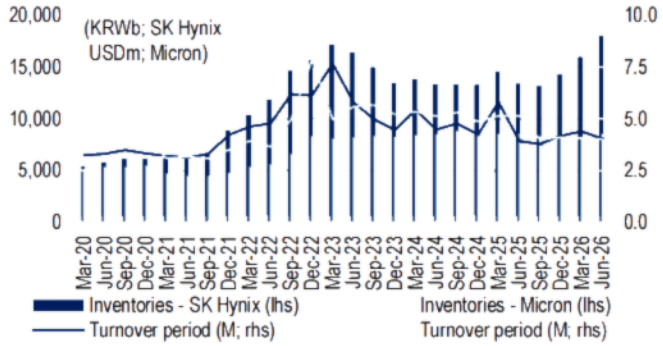
Source: Company reports, J.P. Morgan.

Figure 48: Inventory trend (Samsung Electronics)



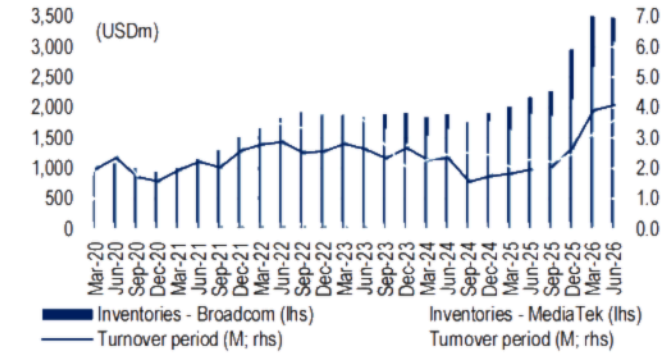
Source: Company reports, J.P. Morgan.

Figure 49: Inventory trend (SK hynix, Micron)



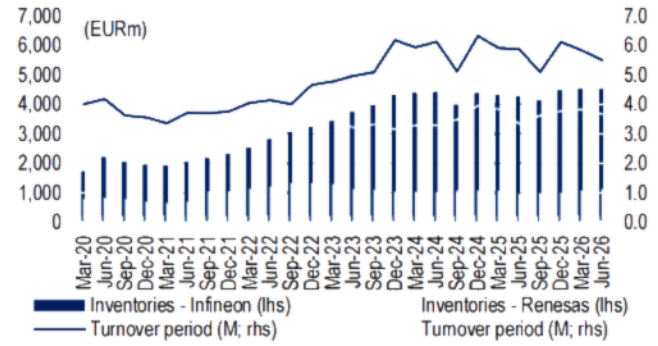
Source: Company reports, J.P. Morgan.
Note: Micron's quarterly period ends in Feb./May/Aug./Nov.

Figure 50: Inventory trend (Broadcom, MediaTek)



Source: Company reports, J.P. Morgan.
Note: Broadcom's quarterly period ends in Jan./Apr./July/Oct.

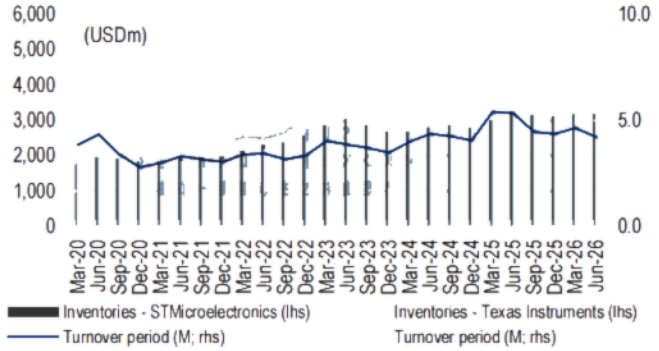
Figure 51: Inventory trend (Infineon, Renesas Electronics)



Source: Company reports, J.P. Morgan.

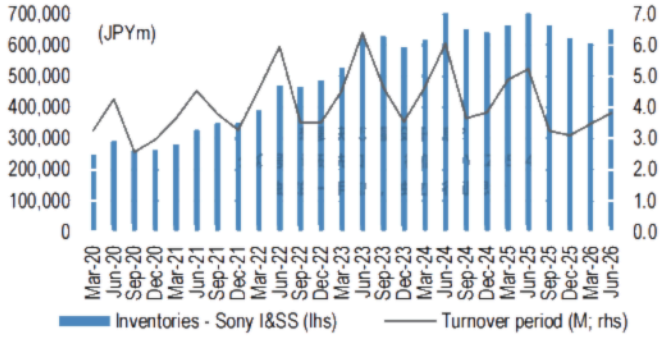
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(81-3) 6736 1313
mio.shikanai@jpmorgan.com

Figure 52: Inventory trend (Texas Instruments, STMicroelectronics)



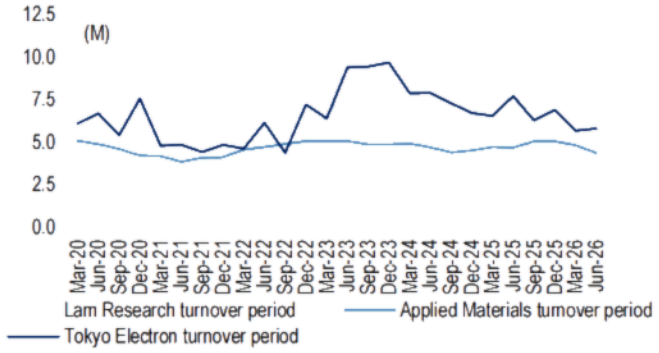
Source: Company reports, J.P. Morgan.

Figure 53: Inventory trend (Sony Group Semi business)



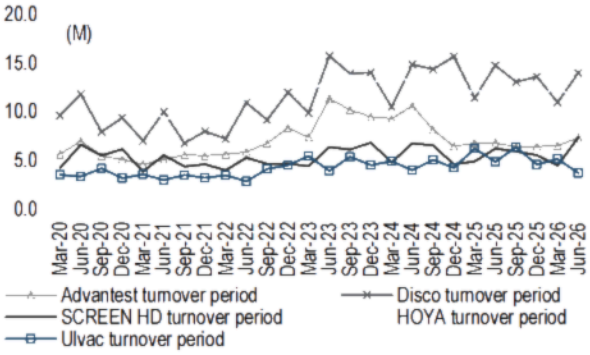
Source: Company reports, J.P. Morgan.
Note: Inventory turnover period is calculated based on sales.

Figure 54: Inventory trend (Lam Research, AMAT, TEL)



Source: Company reports, J.P. Morgan.

Figure 55: Inventory trend (Advantest, Disco, SCREEN HD, HOYA, Ulvac)



Source: Company reports, J.P. Morgan.

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(81-3) 6736 1313
mio.shikanai@jpmorgan.com

Figure 56: DRAM wafer capacity (300mm)

DRAM wafer output (12" eq., 300mm, K wspm)	2019	2020	2021	2022	2023	2024	2025	2026E	2027E	2028E
SK hynix	354	354	363	386	338	405	523	573	645	741
Samsung	483	495	574	689	570	604	635	709	790	900
Micron	324	324	325	325	288	301	305	305	354	453
Nanya	69	70	70	69	63	60	61	62	66	84
Winbond	27	27	27	25	23	26	26	32	35	35
Powerchip	50	45	45	40	34	38	40	40	40	40
CXMT	13	28	48	74	88	168	245	295	360	438
Total DRAM capacity	**1,318**	**1,343**	**1,451**	**1,607**	**1,402**	**1,601**	**1,835**	**2,015**	**2,290**	**2,690**

Sequential change (%)	2019	2020	2021	2022	2023	2024	2025	2026E	2027E	2028E
SK hynix	6%	0%	2%	7%	-13%	20%	29%	10%	13%	15%
Samsung	2%	3%	16%	20%	-17%	6%	5%	12%	11%	14%
Micron	7%	0%	0%	0%	-12%	5%	1%	0%	16%	28%
Nanya	2%	2%	-1%	-1%	-9%	-4%	2%	2%	6%	28%
Winbond	45%	0%	0%	-9%	-7%	14%	1%	21%	10%	0%
Powerchip	121%	-10%	0%	-11%	-15%	10%	7%	0%	0%	0%
CXMT	1150%	120%	73%	55%	19%	91%	46%	20%	22%	22%
Total	**8%**	**2%**	**8%**	**11%**	**-13%**	**14%**	**15%**	**10%**	**14%**	**18%**

Capacity share (%)	2019	2020	2021	2022	2023	2024	2025	2026E	2027E	2028E
SK hynix	27%	26%	25%	24%	24%	25%	28%	28%	28%	28%
Samsung	37%	37%	40%	43%	41%	38%	35%	35%	35%	33%
Micron	25%	24%	22%	20%	21%	19%	17%	15%	15%	17%
Nanya	5%	5%	5%	4%	4%	4%	3%	3%	3%	3%
Winbond	2%	2%	2%	2%	2%	2%	1%	2%	2%	1%
Powerchip	4%	3%	3%	2%	2%	2%	2%	2%	2%	1%
CXMT	1%	2%	3%	5%	6%	10%	13%	15%	16%	16%
Total capacity	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

HBM capacity (k wspm)	2019	2020	2021	2022	2023	2024	2025	2026E	2027E	2028E
Samsung					51	99	145	198	250	330
SK hynix					46	99	158	191	260	320
Micron					4	16	49	83	128	185
Total					**101**	**214**	**351**	**471**	**638**	**835**
HBM as % of total WSPM					*7%*	*13%*	*19%*	*23%*	*28%*	*31%*

Source: IHS, company data, J.P. Morgan estimates
Note: J.P. Morgan Global Memory Model.

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Mio Shikanai AC
(81-3) 6736 1313
mio.shikanai@jpmorgan.com

Figure 57: NAND wafer capacity (300mm)

Wafer capacity (12" Eq. 300mm, K wspm)	2019	2020	2021	2022	2023	2024	2025	2026E	2027E	2028E
SK hynix	207	201	230	248	159	168	163	165	165	173
Samsung	424	458	570	629	463	423	395	395	395	395
Micron	184	179	175	164	110	109	104	108	115	123
Kioxia	498	518	610	601	429	401	395	413	431	440
Intel	61	63	60	59	45	50	52	55	55	60
YMTC	17	35	64	81	63	108	149	163	195	220
Total	**1,391**	**1,452**	**1,709**	**1,781**	**1,268**	**1,258**	**1,257**	**1,298**	**1,356**	**1,410**

Sequential change (%)	2019	2020	2021	2022	2023	2024	2025	2026E	2027E	2028E
SK hynix	-2%	-3%	14%	8%	-36%	6%	-3%	2%	0%	5%
Samsung	-5%	8%	25%	10%	-26%	-9%	-7%	0%	0%	0%
Micron	-10%	-3%	-2%	-6%	-33%	-1%	-5%	4%	7%	7%
Kioxia	-8%	4%	18%	-1%	-29%	-6%	-2%	4%	5%	2%
Intel	23%	2%	-4%	-2%	-23%	11%	4%	6%	0%	9%
YMTC	282%	101%	83%	27%	-23%	72%	38%	9%	20%	13%
Total	**-5%**	**4%**	**18%**	**4%**	**-29%**	**-1%**	**0%**	**3%**	**5%**	**4%**

Capacity share (%)	2019	2020	2021	2022	2023	2024	2025	2026E	2027E	2028E
SK hynix	15%	14%	13%	14%	13%	13%	13%	13%	12%	12%
Samsung	30%	32%	33%	35%	36%	34%	31%	30%	29%	28%
Micron	13%	12%	10%	9%	9%	9%	8%	8%	8%	9%
Kioxia	36%	36%	36%	34%	34%	32%	31%	32%	32%	31%
Intel	4%	4%	4%	3%	4%	4%	4%	4%	4%	4%
YMTC	1%	2%	4%	5%	5%	9%	12%	13%	14%	16%

Bit shipment share (%)	2019	2020	2021	2022	2023	2024	2025	2026E	2027E	2028E
SK hynix	11%	12%	14%	19%	21%	18%	17%	17%	16%	16%
Samsung	37%	35%	35%	32%	34%	34%	29%	28%	28%	27%
Micron	12%	11%	11%	10%	11%	11%	12%	12%	12%	11%
Kioxia + WD	35%	35%	34%	31%	31%	30%	31%	30%	30%	30%
Intel	5%	5%	4%	5%	0%	0%	0%	0%	0%	0%
YMTC	5%	6%	7%	8%	4%	8%	12%	13%	15%	16%

Source: IHS, company data, J.P. Morgan estimates
Note: J.P. Morgan Global Memory Model.

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Mio Shikanai AC
(81-3) 6736 1313
mio.shikanai@jpmorgan.com

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Figure 58: Samsung Electronics capex breakdown estimates

(Wtrn)	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026E	2027E	2028E
Won/US$	1,053	1,126	1,159	1,130	1,100	1,166	1,180	1,144	1,292	1,307	1,364	1,422	1,471	1,430	1,400
Semiconductor	**13.5**	**14.7**	**12.7**	**27.0**	**23.5**	**22.7**	**32.9**	**43.0**	**45.3**	**51.8**	**43.7**	**40.8**	**71.8**	**91.0**	**98.0**
Memory	**7.0**	**6.5**	**4.5**	**6.8**	**13.0**	**8.5**	**10.7**	**16.0**	**17.8**	**21.9**	**26.0**	**28.2**	**48.3**	**67.0**	**70.5**
DRAM	3.5	4.7	5.5	13.5	7.0	7.7	11.2	12.5	12.5	11.5	7.7	7.8	8.5	10.0	11.5
NAND	3.0	3.5	2.7	6.7	3.5	6.5	11.0	14.5	15.0	18.4	10.0	4.8	15.0	14.0	16.0
System LSI	3.7	4.8	9.4	13.9	3.9	1.8	4.2	2.9	2.6	2.4	4.7	3.2	2.7	3.2	3.4
Display	**1.5**	**1.3**	**0.5**	**0.5**	**0.4**	**0.1**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
LCD	2.2	3.5	8.9	13.4	3.5	1.7	4.2	2.9	2.6	2.4	4.7	3.2	2.7	3.2	3.4
OLED	4.3	5.4	1.6	1.4	1.5	0.7	0.3	1.0	1.2	2.6	2.1	2.2	2.8	2.9	3.5
DX	0.6	1.0	0.5	0.5	0.6	0.2	0.2	0.3	0.4	0.9	0.9	1.4	1.9	2.2	2.4
Others	22.0	25.9	24.1	42.8	29.6	25.4	37.6	47.1	49.4	57.6	51.4	47.5	79.1	99.3	107.3
Total (W in trillion)	**22.0**	**25.9**	**24.1**	**42.8**	**29.6**	**25.4**	**37.6**	**47.1**	**49.4**	**57.6**	**51.4**	**47.5**	**79.1**	**99.3**	**107.3**
Total (US$ in billion)	**20.9**	**23.0**	**20.8**	**37.9**	**26.9**	**21.8**	**31.9**	**41.2**	**38.3**	**44.1**	**37.7**	**33.4**	**53.8**	**69.4**	**76.6**
YoY%	-1%	10%	-9%	82%	-29%	-19%	46%	29%	-7%	15%	-14%	-11%	61%	29%	42%

Source: Company data, J.P. Morgan estimates.
Note: Samsung Electronics is covered by Jay Kwon. Based on report published on July 30, 2026.

Figure 59: ASML: Stepper sales estimates

	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026E	2027E	2028E
Orders by Units														
High NA EUV								10	2	2	2	4	14	
EUV	5	13	21	20	45	24	78	74	53	37	74	80	80	
Immersion, new	71	70	119	83	79	93	144	203	126	127	134	100	105	
Dry, new	71	54	94	108	92	164	394	234	148	181	168	190	160	
Refurbs	18	20	21	30	19	22	40	32	23	22	46	40	40	
Total	**165**	**157**	**255**	**241**	**235**	**303**	**657**	**553**	**352**	**369**	**424**	**414**	**399**	
Revenue by Units														
High NA EUV				10	10	10	10	10	10	10	10	10	10	10
EUV	1	5	11	18	26	31	42	40	53	42	44	64	86	106
Immersion, new	71	74	86	86	82	68	81	81	125	129	131	131	170	211
ArF dry			14	72	72	72	72	72	80	80	80	80	80	80
KrF			71	202	202	202	202	202	212	212	212	212	212	212
i-line	25	18	26	81	81	81	81	81	85	85	85	85	85	85
DUV units	143	136	171	206	203	227	267	305	396	374	279	415	510	588
Total	**169**	**159**	**198**	**224**	**229**	**258**	**309**	**345**	**449**	**418**	**327**	**484**	**602**	**704**
ASP on Units Revenued (EUR mn)														
High NA EUV					€ 0.0	€ 0.0	€ 0.0	€ 0.0	€ 0.0	€ 0.0	€ 377.5	€ 390.0	€ 400.0	€ 410.0
EUV	€ 68.0	€ 65.8	€ 99.3	€ 104.8	€ 107.6	€ 145.0	€ 149.2	€ 177.0	€ 171.50	€ 185.3	€ 230.5	€ 232.1	€ 240.0	€ 250.0
Immersion, new	€ 45.9	€ 47.1	€ 46.4	€ 56.0	€ 57.5	€ 57.5	€ 61.7	€ 64.6	€ 72.5	€ 75.1	€ 78.0	€ 83.6	€ 80.0	€ 80.0
ArF dry				€ 17.8	€ 17.8	€ 17.8	€ 19.9	€ 22.2	€ 24.0	€ 27.6	€ 30.6	€ 30.5	€ 29.0	€ 29.0
KrF				€ 11.2	€ 10.5	€ 10.2	€ 9.9	€ 11.2	€ 11.9	€ 13.0	€ 13.5	€ 13.5	€ 13.5	€ 13.5
i-line				€ 3.2	€ 4.1	€ 4.0	€ 4.1	€ 3.9	€ 4.0	€ 6.1	€ 4.5	€ 5.5	€ 5.5	€ 5.5
DUV units				€ 33.2	€ 34.2	€ 27.7	€ 28.8	€ 29.0	€ 30.9	€ 34.3	€ 43.1	€ 36.5	€ 36.5	€ 38.3
Average ASP, New Systems Only	**€ 28.5**	**€ 31.9**	**€ 34.6**	**€ 35.4**	**€ 38.1**	**€ 38.7**	**€ 42.5**	**€ 42.9**	**€ 47.5**	**€ 50.7**	**€ 72.4**	**€ 66.0**	**€ 69.2**	**€ 75.5**
Revenue Breakdown (EUR mn)														
High NA EUV						€ 0	€ 0	€ 0	€ 0	€ 580	€ 1,510	€ 1,950	€ 2,400	€ 4,100
EUV	€ 68	€ 329	€ 1,092	€ 1,886	€ 2,797	€ 4,494	€ 6,267	€ 7,079	€ 9,090	€ 7,783	€ 10,142	€ 14,856	€ 20,640	€ 26,500
Immersion, new	€ 3,257	€ 3,483	€ 3,993	€ 4,812	€ 4,711	€ 3,913	€ 5,001	€ 5,232	€ 9,057	€ 9,689	€ 10,222	€ 10,954	€ 13,600	€ 16,880
ArF dry				€ 285	€ 393	€ 392	€ 437	€ 620	€ 769	€ 772	€ 489	€ 1,402	€ 2,001	€ 2,320
KrF				€ 872	€ 683	€ 1,049	€ 1,303	€ 1,684	€ 2,198	€ 1,979	€ 1,057	€ 2,517	€ 2,579	€ 2,862
i-line				€ 83	€ 138	€ 135	€ 137	€ 177	€ 219	€ 396	€ 245	€ 285	€ 438	€ 466
DUV total	€ 4,041	€ 4,168	€ 4,863	€ 5,969	€ 5,787	€ 5,354	€ 6,741	€ 7,536	€ 12,243	€ 12,836	€ 12,013	€ 15,158	€ 18,618	€ 22,528
Refurbs	€ 128	€ 73	€ 142	€ 0	€ 0	€ 0	€ 0	€ 0	€ 0	€ 0	€ 0	€ 0	€ 0	€ 0
Service	€ 2,050	€ 2,224	€ 2,679	€ 2,685	€ 2,824	€ 3,662	€ 4,958	€ 5,743	€ 5,620	€ 6,494	€ 8,193	€ 11,150	€ 12,265	€ 13,491
HMI + Metrology + Other inspection tools			€ 277	€ 321	€ 288	€ 334	€ 508	€ 638	€ 606	€ 570	€ 810	€ 953	€ 1,095	€ 1,205
Total Revenue	**€ 10,328**	**€ 10,962**	**€ 13,916**	**€ 10,944**	**€ 11,834**	**€ 13,978**	**€ 18,611**	**€ 21,174**	**€ 27,559**	**€ 28,263**	**€ 32,667**	**€ 44,066**	**€ 55,018**	**€ 67,824**
YoY %	7%	6%	27%	-21%	8%	18%	33%	14%	30%	3%	16%	35%	25%	23%

Source: Company data, J.P. Morgan estimates.
Note: ASML is covered by Sandeep Deshpande. Based on report on Junly 16, 2026.

JPMorgan Securities Japan Co., Ltd.
Mio Shikanai [AC]
(81-3) 6736 1313
mio.shikanai@jpmorgan.com

Figure 60: Global SPE shipment trend by category

CY ($mn)	Mask	YoY	Wafer Mfg.	YoY	Wafer Process	YoY	Assemble	YoY	Test	YoY	Fab	YoY	Total	YoY
2011	1,113	36.4%	107	19.5%	34,345	14.8%	3,338	-14.0%	3,772	-9.1%	852	-21.1%	43,526	9.0%
2012	1,262	13.4%	87	-18.5%	28,340	-17.5%	3,051	-8.6%	3,541	-6.1%	796	-6.5%	37,078	-14.8%
2013	682	-46.0%	53	-38.8%	25,183	-11.1%	2,288	-25.0%	2,691	-24.0%	683	-14.2%	31,580	-14.8%
2014	802	17.6%	58	8.6%	29,165	15.8%	3,071	34.2%	3,555	32.1%	760	11.2%	37,410	18.5%
2015	963	20.1%	61	5.4%	28,796	-1.3%	2,504	-18.4%	3,328	-6.4%	875	15.1%	36,527	-2.4%
2016	734	-23.7%	64	5.0%	32,545	13.0%	2,993	19.5%	3,690	10.9%	981	12.2%	41,007	12.3%
2017	953	29.9%	68	6.2%	45,508	39.8%	3,881	29.7%	4,697	27.3%	1,580	61.0%	56,687	38.2%
2018	1,054	10.6%	110	61.1%	52,155	14.6%	4,014	3.4%	5,633	19.9%	1,529	-3.2%	64,494	13.8%
2019	1,336	26.7%	122	11.5%	48,575	-6.9%	2,859	-28.8%	5,008	-11.1%	1,456	-4.7%	59,356	-8.0%
2020	1,559	16.7%	130	6.7%	58,140	19.7%	3,761	31.6%	6,004	19.9%	1,434	-1.5%	71,028	19.7%
2021	1,548	-0.7%	138	5.6%	83,814	44.2%	7,175	90.8%	7,829	30.4%	2,137	49.0%	102,641	44.5%
2022	2,144	38.5%	235	70.4%	89,941	7.3%	5,845	-18.5%	7,504	-4.2%	1,863	-12.8%	107,532	4.8%

Source: SEMI, J.P. Morgan.

Figure 61: SPE shipment trend by geographic location

CY ($mn)	Japan	YoY	N. America	YoY	Europe	YoY	Korea	YoY	Taiwan	YoY	China	YoY	Others	YoY	Shipment	YoY
2011	5,807	30.8%	9,256	60.9%	4,215	80.4%	8,655	0.3%	8,525	-24.2%	3,654	-0.7%	3,414	-11.1%	43,526	9.0%
2012	3,367	-42.0%	8,159	-11.9%	2,523	-40.2%	8,920	3.1%	9,539	11.9%	2,487	-31.9%	2,084	-39.0%	37,078	-14.8%
2013	3,380	0.4%	5,255	-35.6%	1,913	-24.2%	5,130	-42.5%	10,568	10.8%	3,267	31.3%	2,068	-0.7%	31,580	-14.8%
2014	4,177	23.6%	8,185	55.7%	2,383	24.6%	6,743	31.4%	9,392	-11.1%	4,370	33.8%	2,161	4.5%	37,410	18.5%
2015	5,486	31.3%	5,121	-37.4%	1,944	-18.4%	7,467	10.7%	9,636	2.6%	4,904	12.2%	1,971	-8.8%	36,527	-2.4%
2016	4,633	-15.5%	4,475	-12.6%	2,171	11.7%	7,610	1.9%	12,150	26.1%	6,428	31.1%	3,540	79.6%	41,007	12.3%
2017	6,453	39.3%	5,621	25.6%	3,657	68.4%	18,068	137.4%	11,492	-5.4%	8,208	27.7%	3,189	-9.9%	56,687	38.2%
2018	9,466	46.7%	5,818	3.5%	4,218	15.4%	17,727	-1.9%	10,127	-11.9%	13,109	59.7%	4,028	26.3%	64,494	13.8%
2019	6,275	-33.7%	8,148	40.0%	2,275	-46.1%	9,969	-43.8%	17,116	69.0%	13,451	2.6%	2,519	-37.5%	59,753	-7.4%
2020	7,565	20.6%	6,463	-20.7%	2,621	15.2%	16,046	61.0%	17,100	-0.1%	18,734	39.3%	2,498	-0.8%	71,028	18.9%
2021	7,839	3.6%	7,598	17.6%	3,209	22.4%	24,992	55.7%	24,959	46.0%	29,618	58.1%	4,420	76.9%	102,641	44.5%
2022	8,349	6.5%	10,432	37.3%	6,235	94.3%	21,485	-14.0%	26,850	7.6%	28,207	-4.8%	5,974	35.2%	107,532	4.8%

Source: SEMI, J.P. Morgan.

JPMorgan Securities Japan Co., Ltd.
Mio Shikanai AC
(81-3) 6736 1313
mio.shikanai@jpmorgan.com

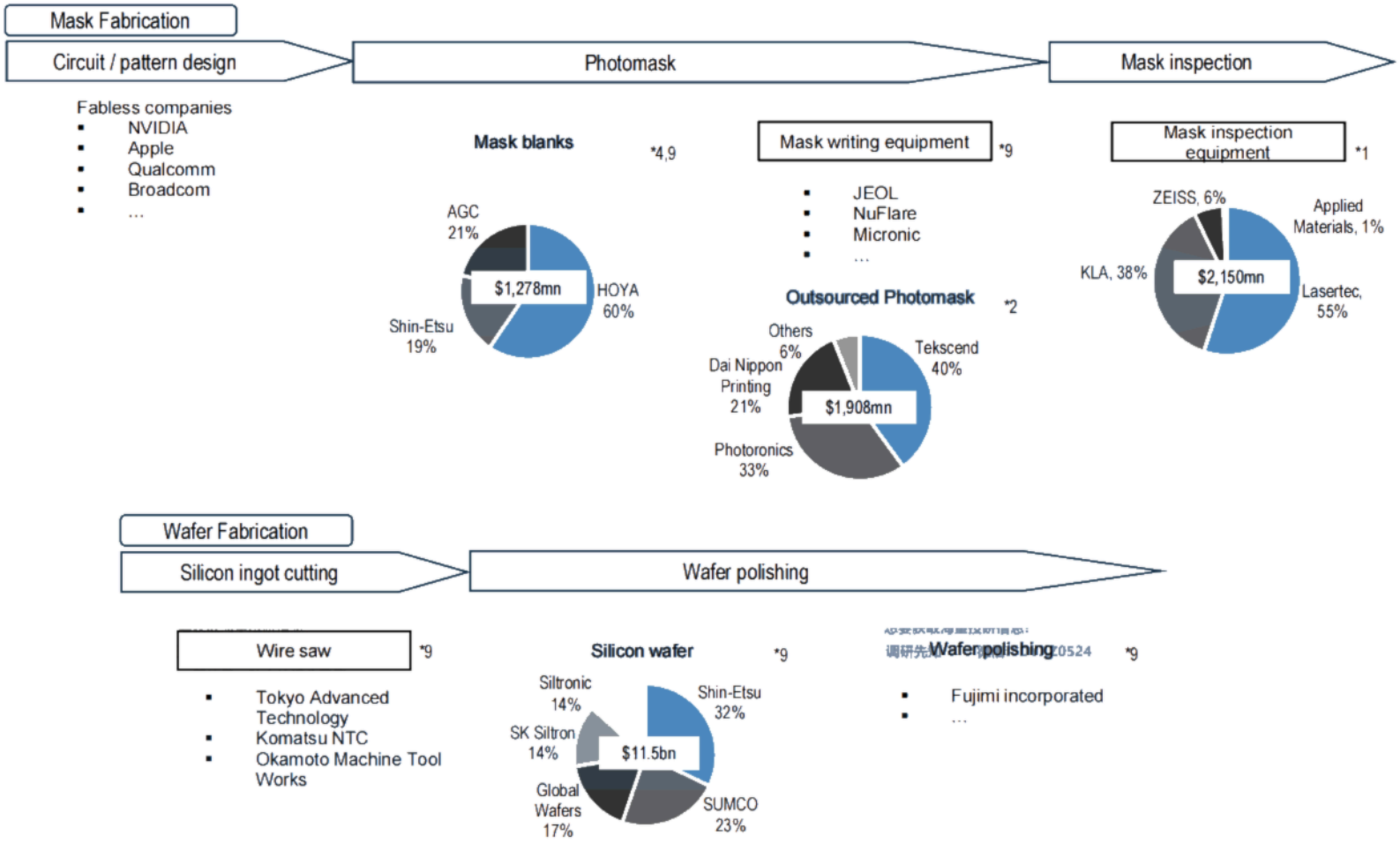
Figure 62: SPE shipment trends

(¥bn)	Japan-based SPE			Japan-based FPD Equipment		
	Shipment	YoY	MoM	Shipment	YoY	MoM
2021	3,076.8	37.1%		516.4	25.2%	
2022	3,851.7	25.2%		435.4	-15.7%	
2023	3,608.9	-6.3%		300.1	-31.1%	
2024	4,435.6	22.9%		303.9	1.3%	
2025	4,214.4	-5.0%		308.4	1.5%	
Jan-23	299.8	-2.1%	-2.2%	24.5	-44.2%	-10.1%
Feb-23	294.5	0.2%	-1.8%	24.3	-44.6%	-0.9%
Mar-23	337.0	7.0%	14.4%	41.5	16.7%	70.9%
Apr-23	336.2	9.8%	-0.3%	41.6	40.5%	0.0%
May-23	315.7	2.6%	-6.1%	37.5	40.5%	-9.7%
Jun-23	260.9	-8.3%	-17.4%	21.2	-14.1%	-43.6%
Jul-23	281.6	-12.2%	7.9%	19.4	-34.4%	-8.2%
Aug-23	287.8	-17.1%	2.2%	17.7	-61.2%	-9.0%
Sep-23	299.5	-21.4%	4.1%	13.7	-72.1%	-22.5%
Oct-23	289.2	-16.7%	-3.4%	14.5	-68.3%	5.4%
Nov-23	300.2	-10.5%	3.8%	16.9	-49.6%	17.0%
Dec-23	306.4	-0.1%	2.1%	27.2	-0.2%	60.9%
Jan-24	314.9	5.0%	2.8%	28.3	15.4%	3.9%
Feb-24	317.4	7.8%	0.8%	28.8	18.5%	1.8%
Mar-24	365.7	8.5%	15.2%	23.8	-42.7%	-17.4%
Apr-24	389.1	15.7%	6.4%	27.5	-33.8%	15.7%
May-24	401.0	27.0%	3.0%	28.6	-23.9%	3.8%
Jun-24	344.0	31.8%	-14.2%	33.8	59.6%	18.3%
Jul-24	348.1	23.6%	1.2%	31.2	60.3%	-7.8%
Aug-24	351.1	22.0%	0.9%	31.6	78.3%	1.3%
Sep-24	369.6	23.4%	5.3%	24.4	77.5%	-22.8%
Oct-24	385.7	33.4%	4.4%	23.7	64.0%	-2.7%
Nov-24	405.8	35.2%	5.2%	25.0	47.9%	5.6%
Dec-24	443.4	44.7%	9.3%	29.5	8.3%	17.8%
Jan-25	416.8	32.4%	-6.0%	29.5	4.3%	0.1%
Feb-25	412.1	29.8%	-1.1%	29.2	1.4%	-1.0%
Mar-25	432.4	18.2%	4.9%	25.3	6.3%	-13.4%
Apr-25	447.0	14.9%	3.4%	26.5	-3.6%	4.9%
May-25	446.3	11.3%	-0.2%	27.9	-2.2%	5.3%
Jun-25	404.6	17.6%	-9.3%	35.0	3.5%	25.1%
Jul-25	410.9	18.1%	1.6%	36.9	18.5%	5.6%
Aug-25	405.8	15.6%	-1.3%	32.7	3.7%	-11.4%
Sep-25	424.6	14.9%	4.6%	30.3	24.6%	-7.3%
Oct-25	413.9	7.3%	-2.5%	27.8	17.1%	-8.5%
Nov-25	420.7	3.7%	1.6%	30.4	21.4%	9.4%
Dec-25	423.5	-4.5%	0.7%	28.4	-3.8%	-6.6%
Jan-26	427.5	2.6%	0.9%	31.6	7.2%	11.5%
Feb-26	423.1	2.7%	-1.0%	30.5	4.4%	-3.6%
Mar-26	480.2	11.1%	13.5%	26.2	3.6%	-14.1%
Apr-26	510.2	14.1%	6.2%	20.9	-21.2%	-20.2%
May-26	526.4	17.9%	3.2%	22.5	-19.6%	7.4%
Jun-26	513.6	26.9%	-2.4%	23.2	-33.5%	3.5%
Jul-26	556.2	35.4%	8.3%	27.1	-26.5%	16.7%

Source: SEAJ, J.P. Morgan.
Note: Preliminary figures for July 2026.

JPMorgan Securities Japan Co., Ltd.
Mio Shikanai AC
(81-3) 6736 1313
mio.shikanai@jpmorgan.com

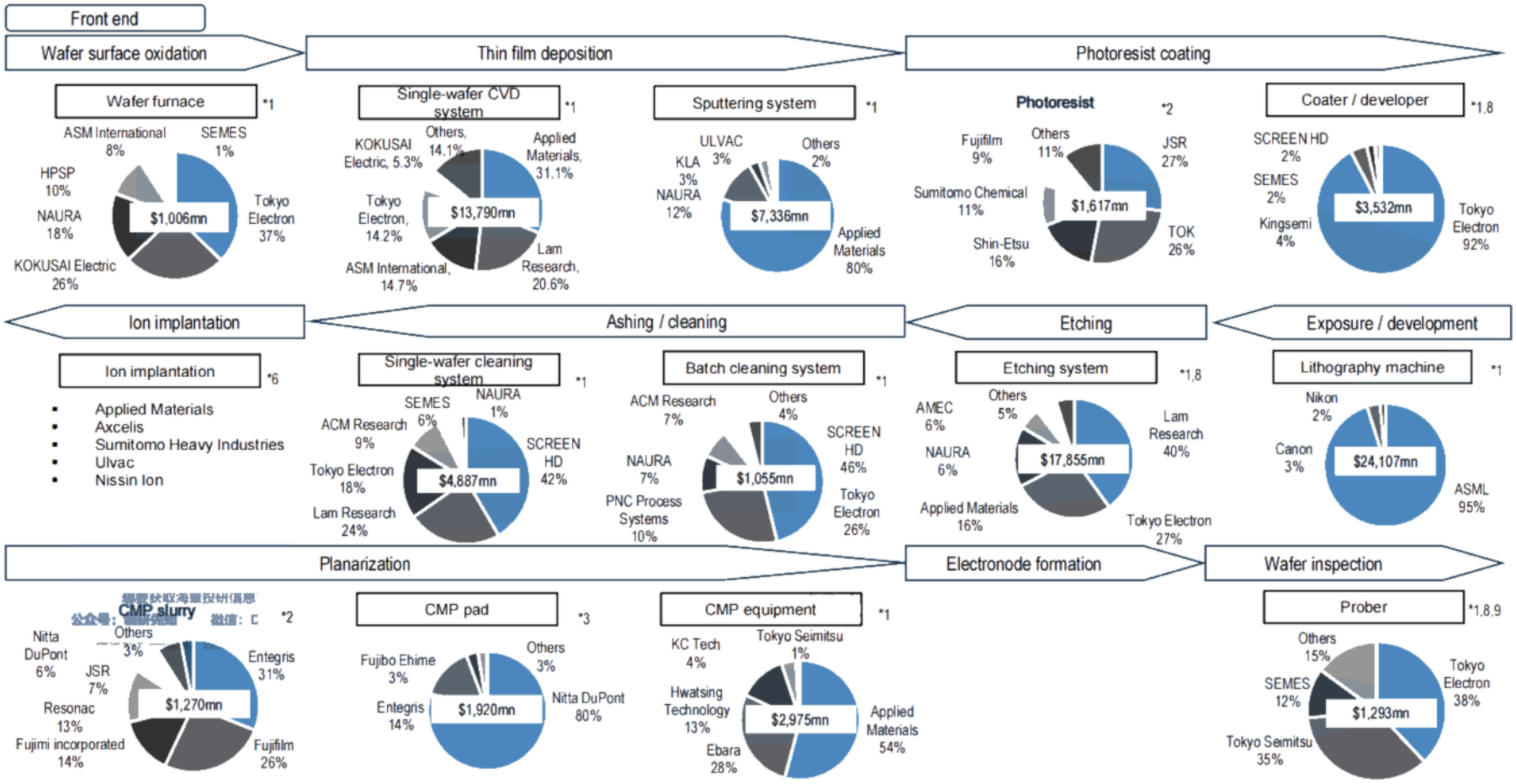
Figure 63: Wafer and mask fabrication (before the front-end process) SPE and material makers



Source: *1: Gartner®(2025), *2: Electronic Device Industry Newspaper (2025), *3: Fuji Keizai (2024), *4: The Nikkei (2024), *5: Chemical Industry Daily (2024), *6: Nikkan Kogyo Shimbun (2024), *7: Nikkei Sangyo Shimbun (2024), *8: Company reports, *9: J.P. Morgan.
Note: Market share estimates are J.P. Morgan estimates as of CY2024.

JPMorgan Securities Japan Co., Ltd.
Mio Shikanai AC
(81-3) 6736 1313
mio.shikanai@jpmorgan.com

Figure 64: Front-end process SPE and material makers

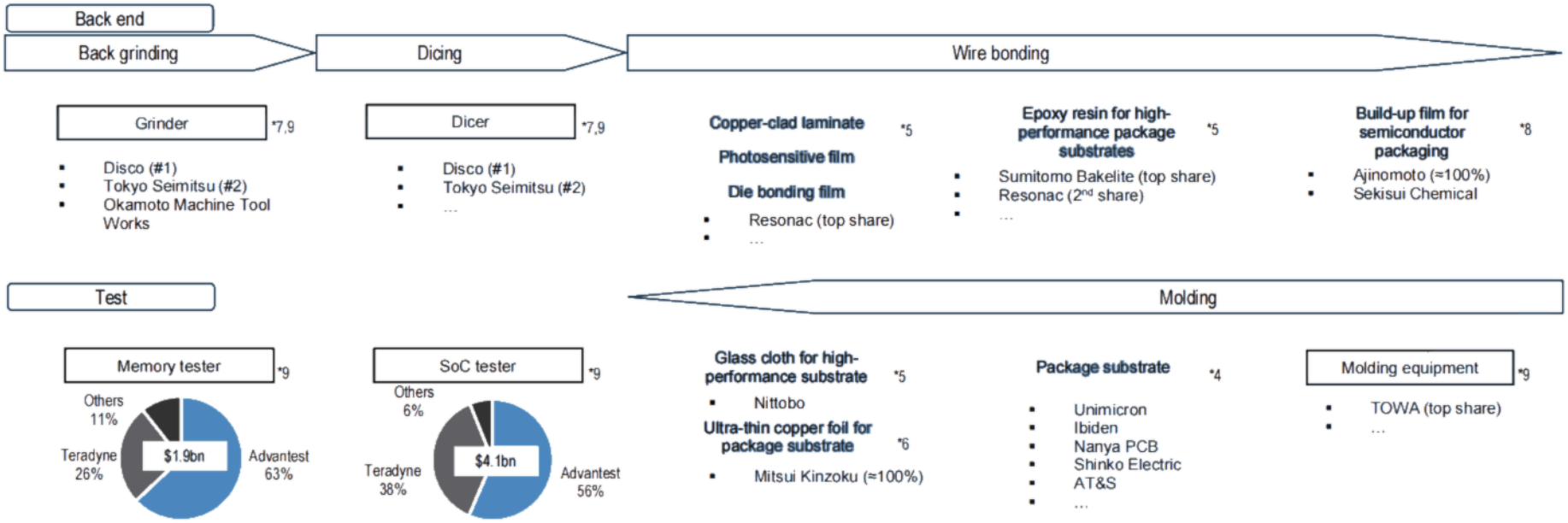


Source: *1: Gartner®(2025), *2: Electronic Device Industry Newspaper (2025), *3: Fuji Keizai (2024), *4: The Nikkei (2024), *5: Chemical Industry Daily (2024), *6: Nikkan Kogyo Shimbun (2024), *7: Nikkei Sangyo Shimbun (2024), *8: Company reports, *9: J.P. Morgan.
Note: Market share for CMP slurry and CPM pad on CY2023 estimates, while others are based on J.P. Morgan CY2024 actual estimates.

JPMorgan Securities Japan Co., Ltd.
Mio Shikanai AC
(81-3) 6736 1313
mio.shikanai@jpmorgan.com

J.P.Morgan

Figure 65: Back-end process SPE, material makers and inspection equipment makers



Source: *1: Gartner®(2025), *2: Electronic Device Industry Newspaper (2025), *3: Fuji Keizai (2024), *4: The Nikkei (2024), *5: Chemical Industry Daily (2024), *6: Nikkan Kogyo Shimbun (2024), *7: Nikkei Sangyo Shimbun (2024), *8: Company reports, *9: J.P. Morgan.
Note: Market share estimates are J.P. Morgan estimates as of CY2024.